MAR 8 1943

the OIL AND GAS JOURNAL

2-194?

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MARCH 4, 1943

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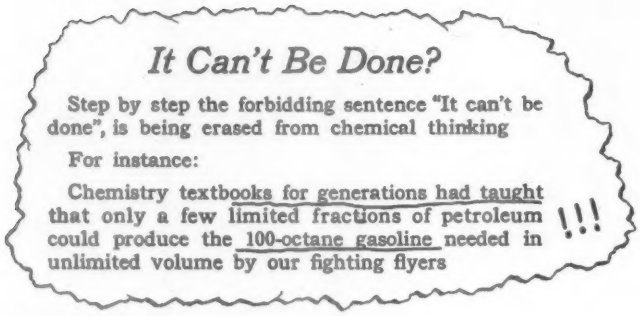

It Can't Be Done?
Step by step the forbidding sentence "It can't be done", is being erased from chemical thinking
For instance:
Chemistry textbooks for generations had taught that only a few limited fractions of petroleum could produce the 100-octane gasoline needed in unlimited volume by our fighting flyers
!!!

Thank you, professor

The above wordless comment on a Universal ad was recently sent in by a widely known professor of chemistry We appreciate this tactful correction

What the paragraph should have said is that chemistry textbooks for generations had taught that paraffin hydrocarbons are inert—not readily reactive That was the generally held belief

And that is the belief exploded by U. O. P. research men

They discovered catalysts and developed processes that have made the paraffins react in lively fashion with other hydrocarbons to produce the constituents of 100-octane gasoline, thereby greatly increasing the potential supply of this vital fighting motor fuel

It's lucky for our fighting men—for all of us—that Universal research men did not stop at the barrier marked "It can't be done"

Thank you, professor

OIL IS AMMUNITION—USE IT WISELY CARE FOR YOUR CAR FOR YOUR COUNTRY

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

THE REFINERS INSTITUTE OF PETROLEUM TECHNOLOGY

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 70

CRUDE PRODUCTION 3,860,075 bbl. daily average—down 34,050 bbl. One year ago 4,015,435 bbl.

CRUDE STOCKS 234,562,000 bbl. as of Feb. 20 — up 323,000 bbl. One year ago 255,861,000 bbl.

GASOLINE STOCKS 92,215,000 bbl. as of Feb. 20—down 98,000 bbl. One year ago 106,984,000 bbl.

RESIDUAL FUEL-OIL STOCKS 70,428,000 bbl. as of Feb. 20—down 238,000 bbl. One year ago 87,825,000.

GAS OIL AND DISTILLATES 33,367,000 bbl. as of Feb. 20—down 925,000 bbl. One year ago 35,433,000.

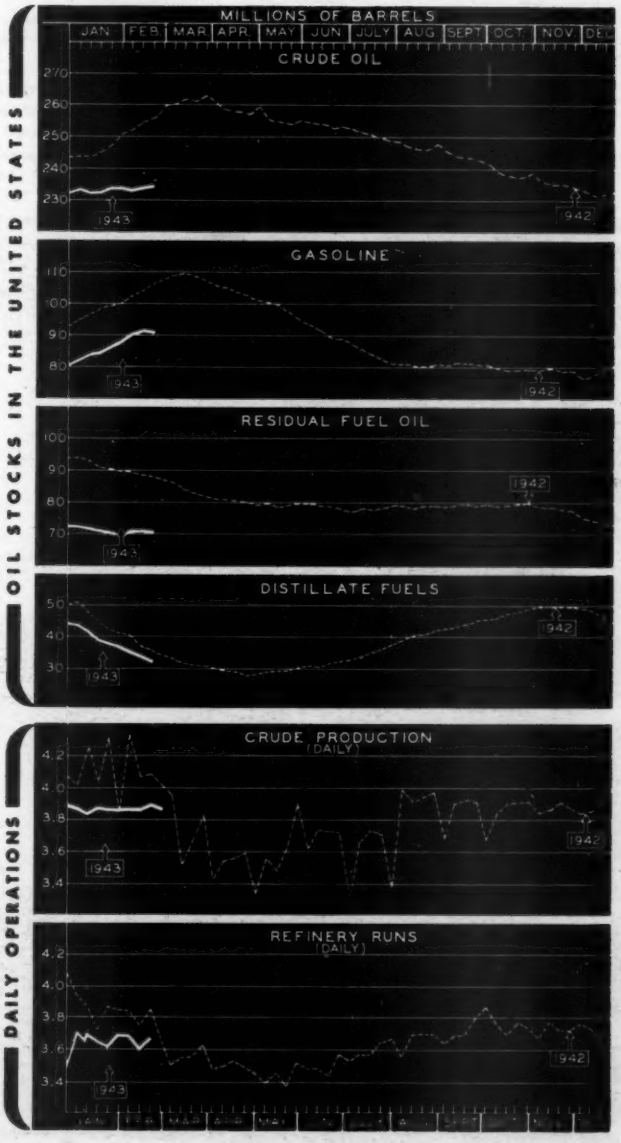
REFINERY RUNS 3,694,000 bbl. daily week ended Feb. 20—up 89,000 bbl. One year ago 3,876,000 bbl.

Refinery report delayed.

REPORTS the first of the week indicated that the partial pooling of crude-oil supplies for refineries in District 2 (Middle West, Oklahoma and Kansas) mentioned on this page last week was nearing completion. The initial adjustments in supplies between refineries which are being carried out under the direction of PAW's District 2 office, provide for the pooling of approximately 40,000 bbl. daily of crude oil. Most of the refining organizations in the district are participating in the pool either as "givers or takers." This includes a few of the major crude-oil-purchasing and pipe-line companies which have made changes in their deliveries.

THE shifts in supplies are being made on a basis largely of war-product operations and transportation conditions. Plants which require additional crude oil to maintain the maximum production of war products are given first consideration. This plan includes not only high-octane aviation motor fuels but also fuel oils and other products required by industries and civilians engaged in war work. Plants which can deliver products with a minimum of transportation are also accorded special consideration in regard to supplies. So far as possible the program seeks to deliver products to consumers from plants and terminals with short truck deliveries. This involves the maximum use of pipe lines and inland waterways.

AVAILABLE information shows that several plants located in Ohio, Indiana, Kentucky and Illinois are securing most of the pooled crude oil. However, there are a few plants in Nebraska, Kansas and Oklahoma whose requests for additional supplies from the pool have been granted. For example, a refinery in Oklahoma with a product pipe line extending into Iowa was tendered several hundred additional barrels of crude oil daily in order that the company could increase its deliveries to terminals on the pipe line from which truck deliveries are made to a large agricultural area. The additional crude oil delivered to more than 20 refineries ranged from 300 to 5,500 bbl. daily, the largest quantity going to an independent refiner in Ohio. Approximately the same number of refiners and crude-oil purchasing companies were giving up crude-oil supplies ranging from 100 to 5,000 bbl. daily. In refining circles developments in the District 2 program were interpreted as pointing to the pattern for refinery operations which will be made effective in the entire country soon.



Oil's POSTWAR Outlook

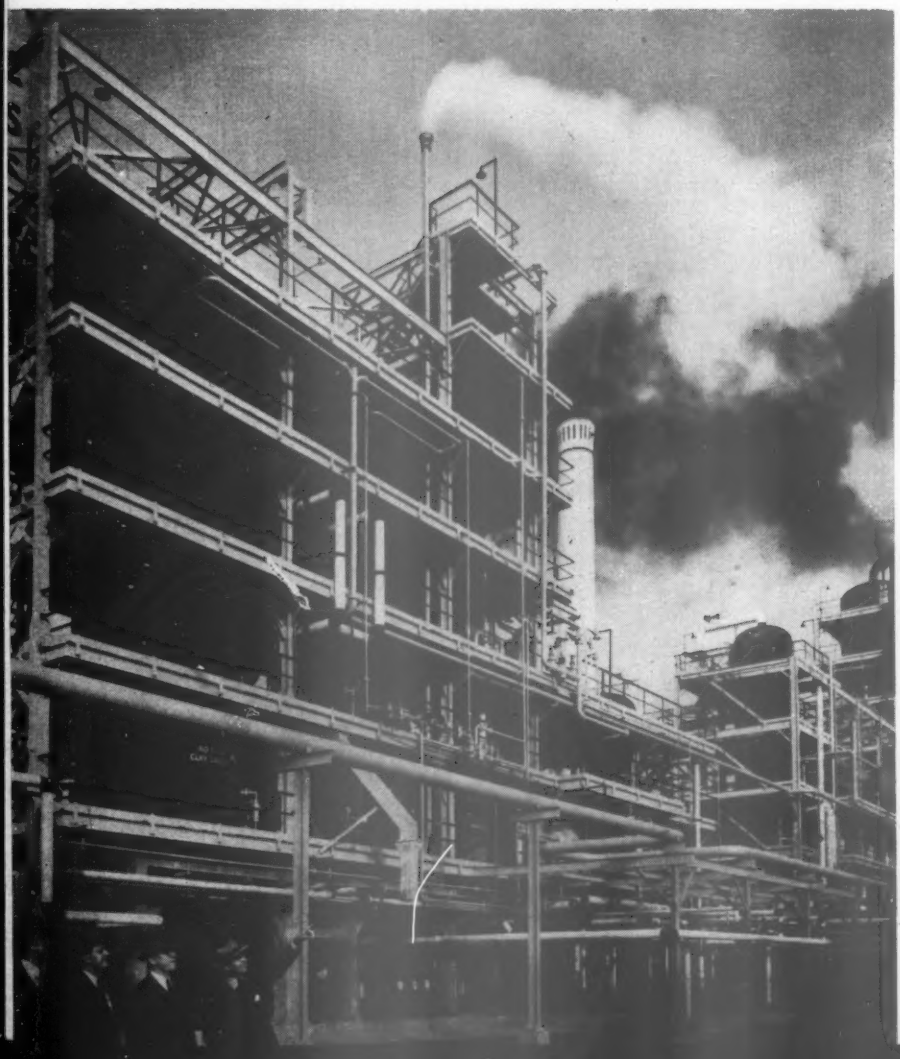
This discussion of postwar outlook deals with the general prospects for all phases of petroleum. The Journal's editorial staff is now assembling more detailed information on each branch of the industry. Reports will appear in later issues.

by J. P. O'Donnell

NEW YORK.—Decision of the Petroleum Industry War Council to undertake a study of the postwar period to prepare the industry for the readjustment that will follow the cessation of hostilities was the first outward sign that oil has recognized the timeliness of such a study. This is in contrast both to other industries and to government which for months have spoken freely of their postwar plans. The oil industry's defense for its delay, if one is needed, is that it has been too busily engaged in supplying the products which will make it possible for this country and her allies, and not the Axis Powers, to determine what kind of a postwar world there shall be when the conflict ends.

In considering the postwar world it is necessary to regard two periods, that immediately following the war during which readjustment will take place and the period which will follow readjustment. The first is of critical importance for it will determine what will follow in the longer period. The critical nature of the first period will be conditioned by the length of the war. The longer hostilities continue, the more critical it will be. Obviously when the war ends it will not be possible to relinquish immediately all forms of control over income and consumption. It will be necessary to continue them, with gradual relaxation, until there is a balance between income and deferred purchasing power on one hand and the production of peacetime goods on the other.

Postwar demand for specialty products is expected to be adequate to engage the emergency butadiene plants irrespective of what happens to natural rubber. This is Standard Oil Co. of Louisiana's new plant at Baton Rouge refinery, the largest yet in operation for making synthetic-rubber components. It will produce enough raw material for 1,300,000 to 2,000,000 tires annually



Long-Range Factors

The length and nature of this control is an important concern of all industry. The understandable tendency of government agencies toward self-perpetuation may result in an extension of control beyond desirable limits. The experience of the oil industry in the past is not reassuring for the future with respect to the nature of the control that may be expected. Its wartime relations with PAW and its predecessor, OPC, have been marked by cooperation and mutual respect. A similar condition has not existed with respect to relations between other government agencies and industry, however, and these agencies will have control over the immediate postwar economy. This control will affect the long-range prospects not only of oil but of all industry.

Just as it was in prewar years, the principal market for the products of the oil industry after the war will be the passenger car. The size of this market will depend on two things, the number of cars in operation and the consumption of oil products per car. With regard to the former one thing is immediately evident: when the war ends there will be fewer cars in operation than there were when it began. Lack of tires, gasoline rationing and inability to obtain repair parts are exacting a heavy toll of passenger cars in spite of efforts to maintain them. It is estimated that scrapping is going on at the rate of 100,000 to 150,000 cars per month. A median figure would mean the loss of 1,500,000 cars per year.

A study of the effects of these factors on the number of cars in operation was made by a PIWC subcommittee and is presented in graphical form in Fig. 1. Curve 4 is believed to be most representative of the ac-

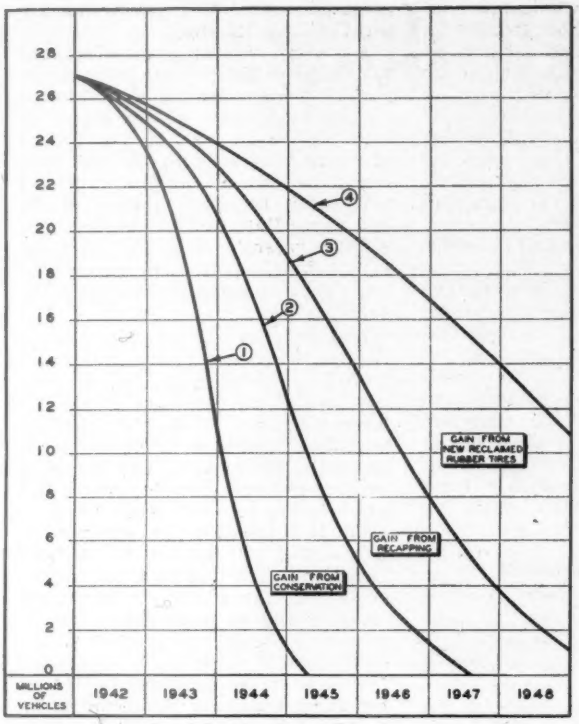


Fig. 1—Passenger vehicles on the road. Curve 1, normal speeds and 9,000 miles per year without recapping; Curve 2, 40 miles per hour top speed and reduction in passenger car mileage, no recapping; Curve 3, 40 miles per hour top speed and 25 per cent reduction in passenger car mileage, with recapping; Curve 4, same as Curve 2, plus rubber to keep all usable cars on road

tual trend. This curve indicates that if the war were to end on December 31, 1943, there would be 24,000,000 cars in service then as compared with 27,000,000 as of January 1, 1942. If the war ends by mid-1944, the number of passenger vehicles is expected to be down to 23,000,000, a decline of 15 per cent from the pre-war total.

This trend will undoubtedly extend beyond the war since it will require some time for the automobile industry to retool. It has been said that manufacture of automobiles can be resumed some 6 months after the end of the war. Thus an additional 500,000 to 1,000,000 cars may be expected to be scrapped between the end of the war and the time production is resumed. Thus if the war were to end in the middle of 1944 there would be an estimated 23,000,000 cars then in operation but this number would be reduced to possibly 22,000,000 before replacements began to become available.

When production is resumed it will probably take more than a year to replace those cars which have been junked since the war began. If it is assumed that the war will end in mid-1944, it is estimated that 22,000,000 cars will be in operation at the end of that year. New-car production would not begin before January 1, 1945. Even if it reached the unheard-of figure of 6,000,000 passenger cars in the first full year of production (the previous high was 1929 when sales totaled 4,587,000) the total number of cars in operation at the beginning of the year plus those produced would total 28,000,000. From this would be subtracted the number scrapped that year which would probably exceed 1,500,000 so that less than 27,000,000 passenger vehicles, the number estimated to be in operation January 1, 1942, would be in service as of January 1, 1946.

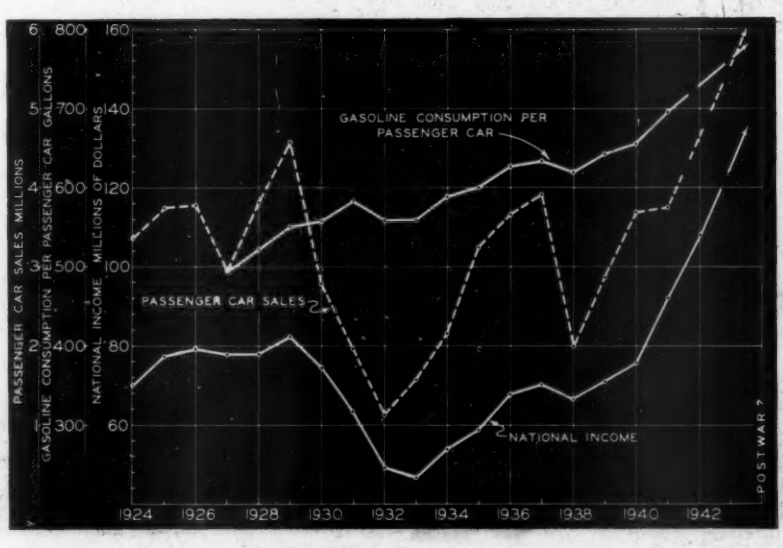
Current indications are that there will be a demand for as many as 6,000,000 passenger vehicles, per year in the postwar era. There is a natural parallel between sales of new passenger cars and national income. Estimates of postwar income are fantastic when compared to actual income in recent years. In the 18 years prior to 1942 it averaged less than $70,000,000,000. In 1942 it reached an approximate $117,000,000,000 and in 1943 it may reach $135,000,000,000. If it maintains that peak it appears that there will be a demand for 6,000,000 passenger cars (see Fig. 2). It has been said that the automobile industry, after the war, will be geared to the production of 10,000,000 vehicles per year.

While the foregoing indicates that it will be at least 1½ years (and longer if the war extends beyond the middle of next year) before the oil industry's major market returns to a volumetric normal, this does not mean that demand for gasoline will lag correspondingly. There is also somewhat of a parallel between gasoline consumption per passenger vehicle and national income. This indicates that if national income in the first postwar year is of the order of $135,000,000,000, consumption per vehicle will likely be of the order of 780 gal., some 12 per cent higher than it was in 1941.

Motor-Car Prospects

Motor-car manufacturers have said that the immediate postwar car will be the car which would have been produced in 1942. Availability of dies will make the first postwar automobile the most readily producible car in quantities sufficient to satisfy the expected demand. If this is correct, the real postwar car embodying the design changes, the use of lighter metals and more efficient engines will not be in production for at least 18 months after the war, allowing 6 months for retooling and 12 months for production of 1942 models. At least another year will probably be required to incorporate all potential improvements in one car. If this car is as efficient as some predictions

Fig. 2—How the rise in national income, deferred automobile replacements, vehicle abandonments and postponed vacations are expected to influence car sales and motor-fuel consumption in the postwar era



suggest, it may signalize a new era, one in which consumption per vehicle will decline.

In addition to the automotive demand, there will undoubtedly be a large increase in aviation-fuel requirements. It is probable that aviation demand will become an appreciable factor from the volume as well as the quality standpoint, something it had not been in prewar years. In 1941, for example, domestic gasoline consumption was 658,474,000 bbl., of which only 10,621,000 bbl. was for aviation use. Thus, aviation demand represented a mere 1.6 per cent of the total and it obviously will require tremendous growth to become a major volume factor.

It is certain that aviation demand will expand greatly in several respects, particularly for intercontinental and other long-distance travel, mail and fast freight. United States plane production was 3,500 per month last year and that figure may be doubled in 1943, but it will still be very small on a unit basis compared with potential automobile production. However, owing to much greater consumption per unit, aviation demand will increase much more rapidly than automotive requirements. Recently a congressional committee forecast that a few years after peace half a million people will be flying their own planes and 20,000,000 passengers will be traveling annually by commercial airline. Much postwar aviation discussion has centered on large cargo planes with apparent disregard of an important factor, fuel requirements. A pertinent commentary is provided in an analysis reported to have been prepared by the U. S. Army Service of Supply which is reproduced in Table 1.

The second major product of the oil industry from a volume standpoint is fuel oil. The parallel between indices of industrial activity and demand for residual fuel oil indicate that a greatly increased demand for heavy fuel oil may be expected. This demand will be regulated in some degree by price and possible price increases may force the oil industry to yield some of this market. For some time past the industry has not been able to fill full domestic requirements without resort to imports. In 1940 domestic demand exceeded domestic production by 7 per cent and in the 9 months of 1941 for which data are available, by 11 per cent. Demand is now being met by a reduction in gasoline yields which will not only return to former levels but in all probability will be able to go considerably higher due to the large-scale adoption of catalytic cracking. Therefore, demand for heavy fuel oil will very likely continue to exceed domestic production necessitating an increase in imports. These would come mainly from the Netherlands West Indies, where costs will be greater because of the higher taxes imposed on Venezuelan crude oil which is processed there.

Fuel-Oil Competition

Competition with heavy fuel oil will be offered by coal, which has benefited competitively in the war. This benefit accrued to coal as a result of the oil-transportation shortage which forced substantial conversion to the use of coal, particularly on the eastern seaboard. Undoubtedly most of this conversion was undertaken as a temporary measure but some may become permanent in those instances where coal possesses a distinct price advantage after the war. In addition some progress is being made in the handling of coal so that the very great advantage oil holds in this respect will be lessened.

A matter of even greater concern to the oil industry than postwar demand is postwar supply. An alarming decline in the rate of discoveries in recent years in spite of the drilling of many wildcats and the use of a record number of exploratory crews makes this the first problem of the industry. Data given before the A.I.M.E. recently by E. DeGolyer, assistant deputy petroleum administrator, show the seriousness of this situation.

This shortage will be alleviated to some extent by providing outlets for West Texas production, but the real need is still the discovery of new reserves. The era of structure finding techniques seems to be passing if it has not already passed and means of locating the stratigraphic pools which are believed to exist needs development. It is possible that geochemical prospecting will provide this needed tool. Until then emphasis on producing oil the "hard way" by secondary recovery and by more efficient operation will necessarily increase. If additional large reserves are not located the trend from an exporting to an importing status for this country, interrupted by the war, will be accelerated.

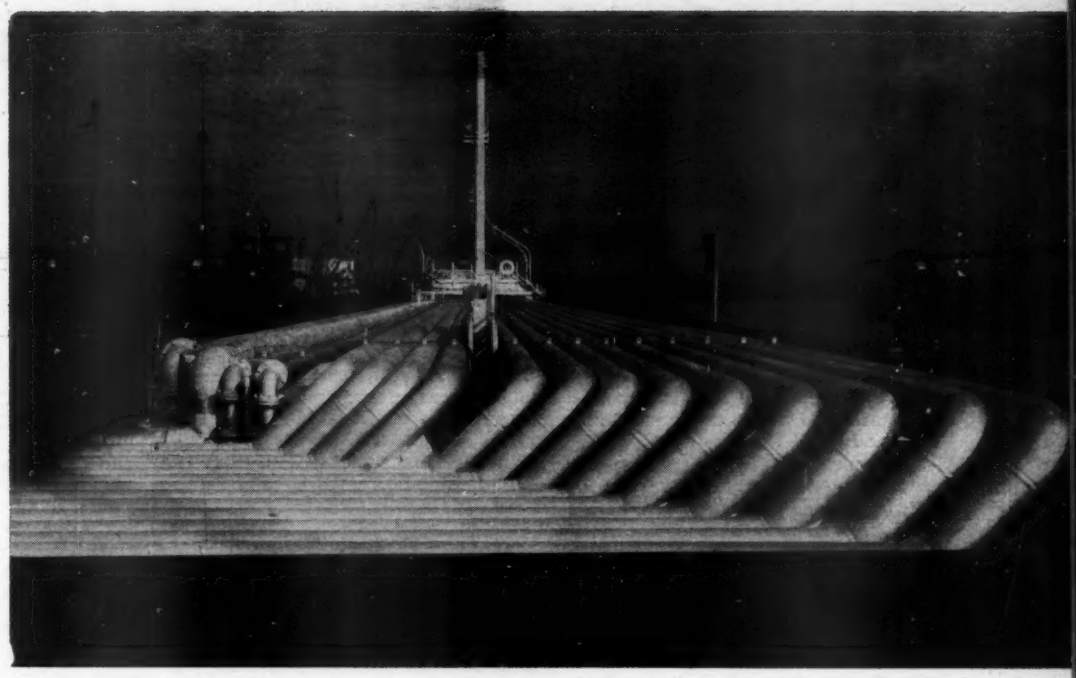
Exports declined from a prewar high of 193,500,000 bbl. in 1938 to 105,900,000 in 1941, a 10-year low. Imports were 93,500,000 bbl. in 1941, the highest in a decade. These changes were caused by war devel-

(Continued on Page 38)

PAW DISCOVERY DATA PRESENTED BEFORE A.I.M.E.

Year—	Wildcats	New fields	New reserves, (mil. bbl.) Added	Per field
1934	....	86	1,699	19.7
1935	....	104	1,934	18.6
1936	....	104	1,894	18.2
1937	2,224	148	2,119	14.3
1938	2,638	166	1,894	11.4
1939	2,589	170	943	5.6
1940	3,038	217	945	4.3
1941	3.264	209	361	1.7
1942	3,045	261	317	1.2

Demand for aviation gasoline will be an appreciable factor after the war. One of the uses which will probably grow is air-freight transport such as that pictured here under way on an emergency delivery



The East Coast's "grand central oil terminal," built as an emergency facility in cooperation with the Petroleum Administration for War, is available to all distributors in the area. It indicates a trend to larger terminals with emphasis on versatility as well as volume. This picture gives some conception of the intricate piping and dock arrangement required to achieve the emergency shipping objectives.

THIS WEEK

TRANSPORTATION—Cards all played in controversy over which end of 20-in. products line shall be built. . . . Nearly equal arguments make decision difficult. . . . UNLESS, WPB can be persuaded to approve entire line from Gulf Coast to Atlantic seaboard, at once. . . . THEN the issues collapse, BECAUSE postwar arguments fall flat, under present circumstances, lack popular appeal, military support, official standing. . . . ¶Tank-car shipments to East Coast rise to 820,553 bbl. daily, up 13,567. . . . ¶Loadings at Norris City, Ill., terminal of WEP increased to between 80,000 and 100,000 bbl. daily. . . ¶Defense Plant Corp. buys Houston Gulf Gas Co.'s 145-mile system, pays $2,625,000 for facilities. . . .

REFINING—WPB cancels priorities for Pan American Refining Co.'s butadiene conversion project at Texas City, Tex. . . . ¶PIWC committee warns of trouble ahead, IF District 2 refiners fail to make immediate, severe downward adjustments in gasoline yields. . . . ¶Crude taken from several Middle West manufacturers, diverted to another group. . . . Formulas are intricate, vary in ratio to number of directives. . . . Rumors circulated that ban on gasoline shipments, by rail, to District 1, may be relaxed in near future. . . . ¶Daily refinery production of 192,000 bbl. promised Venezuela Congress, within 5 years, after war ends, springing from new petroleum law now up for action. . . .

SUPPLIES—East Coast situation "over the hump," except for residual fuel, PIWC informed, in March report. . . . Spotted, local shortages may persist for few weeks, BUT major dangers are behind, until next winter. . . . Rail deliveries to New England continue upward; box cars supplied 24,039 bbl. of kerosene daily; tank cars discharged 157,279 bbl. daily in same area. . . .

EQUIPMENT—Basic order, covering utility companies, supplants P-46 for natural-gas industry, brings it under provisions of U-1. . . . ¶Steel and copper, controlled materials, allocated WEP for second quarter construction on eastern extension. . . . Is first certificate issued to PAW, as claimant agency under CMP. . . .

INTERNATIONAL—Foreign petroleum committee formed at Washington, to coordinate federal agencies' activities. . . . State Department, Lend-Lease, War Shipping, Intra-American Affairs, PAW among factions represented. . . . ¶President Medina of Venezuela flirts with oil capital. . . . Assures bondholders of Venezuelan companies that investments will be protected. . . . ¶German shortage of lubricating oil blamed for retreat in Russia. . . .

PRODUCTION—Administrator Ickes confirms PAW desire for 4,500 wildcat wells this year, promises preferential treatment for exploratory equipment, hints at other incentives. . . . ¶New money, mostly from war-product manufacturers, entering oil industry, through exploration route. . . . ¶Texas' oil-water ratio order in East Texas enjoined, enforcement to continue pending appeal. . . . Permanent injunction may harm WEP crude supply. . . .

RUBBER—Buna-S coming from pilot plants is improving in quality. . . . Know-how enhanced with each production operation, is all important. . . . ¶German tires captured in Egypt, analyzed here, contain 38 per cent natural rubber, lots of carbon black, fabric and the rest is synthetic. . . .

Decision Near on Route of Big Products Pipe Line

by Henry D. Ralph

WASHINGTON, D. C.—A decision on the location of the 800-mile 20-in. products pipe line is expected momentarily from Petroleum Administrator Harold L. Ickes.

The question of whether the western or the eastern half should be built first was hotly debated before Mr. Ickes February 26 at a joint meeting of the PAW general industry committees for Districts 1, 2 and 3, the PIWC pipe-line managing committee, and officials and directors of War Emergency Pipelines, Inc. According to some who attended, the arguments advanced for each proposal seemed so evenly balanced that it would be difficult to predict what the administrator's decision would be.

PAW earlier had decided to build the line from Gulf Coast refineries in the Houston-Beaumont area to Seymour, Ind., and the War Production Board had approved the project. Defense Plant Corp. had agreed to finance the line through a contract with WEP. However, at a press conference last week Mr. Ickes declared that these actions are not binding as to the location and that previous arrangements would not be upset by a new decision to build a line of substantially the same length from the Illinois-Indiana region to the Atlantic seaboard.

Through Line Acceptable

Mid-Continent refining interests who advocate building the eastern section first stated that they would have no objection to the original plan if there were positive assurance that the 20-in. line would be completed all the way from Texas to the East Coast promptly. However, PAW has no definite plans for building the entire line and in obtaining an allocation of steel from WPB for the 800-mile section PAW stated that a survey would be made this spring of the desirability of extending the line from Indiana to New York. Thus, there is no assurance that an allocation of steel would be forthcoming for the remaining half of the line whichever end is built first.

The Mid-Continent interests fear that the line from Texas might never get beyond Indiana, so that at the end of the war the Texas refineries would have a low-cost means of marketing in the Middle West which has heretofore been served by Mid-Continent refineries. They contend that if the eastern leg is built first it can be kept filled with gasoline and other products for the Atlantic Coast area by tank cars and barges and by connections with pipe lines now running from the Mid-Continent into the Illinois-Indiana region.

War products refineries in both the Gulf Coast and Mid-Continent regions have excessive stocks of refined products, and lack of additional storage or transportation facilities is said to threaten closing down such plants in both areas.

Appearing last week before the Truman committee of the Senate, Administrator Ickes promised an early reply to a protest against the Texas-Indiana project filed by Frank Phillips, chairman of the Phillips Petroleum Co., and to a resolution pending in the Senate for a thorough investigation of the project. It is expected that the administrator's decision will be announced simultaneously with the submission of this report to the Truman committee.

Burt E. Hull, vice president and general manager of the WEP; W. Alton Jones, president, and R. K. Davies, deputy petroleum administrator, opening header valves at the 24-in. terminal at Norris City, Ill. George H. Hill, Jr., executive vice president of Defense Supplies Corp., in the background

Factors in Decision

Mr. Ickes indicated the decision would depend upon such factors as the amount of materials the respective legs would require, the relative availability of rail transportation as a substitute for a pipe line on either leg and the net gain in supplies each leg would provide the oil-short east.

Gov. A. F. Schoeppel of Kansas telegraphed protests to President Roosevelt and Administrator Ickes against a proposal to start a second oil pipe line from the Gulf Coast to the East.

Railroad tank cars now used in the east could be used to haul products from Middle West refineries, if they were relieved by completion of the eastern leg of the present line, the governor pointed out.

Gov. Schoeppel said his plan would increase the movement of oil products to the east by 137,000 bbl. daily,

compared with 110,000 bbl. if the south leg of the second line is built first.

Gulf Coast refinery officials, continuing their objections to any change in the original plan, advanced these arguments for construction of the eastern part of the pipe line first:

1. The Houston-Beaumont refining area furnishes more war products than any other area in the nation.

2. The Houston-Beaumont area has a greater selection of crude for the production of war products than does District 2.

3. Coastal refineries have changed their equipment to make the minimum amount of gasoline while producing the maximum amount of war products.

4. Coastal refineries should be given every insurance of maximum transportation because of their large output of critical war products.

Refinery executives also pointed out that production in the Mid-Continent area is declining and that in order to secure sufficient supplies of crude, District 2 refineries are using increasing quantities of oil from Texas, Louisiana and Arkansas.

Tank-car shipments of crude and products from District 3 to District 1 are currently about 620,000 bbl. daily. If the eastern products line is constructed first it is reported that it will increase tank-car shipments from District 3 to over 800,000 bbl. daily which would be a strain on both the oil industry and railroads.

Materials Allocated to WEP

WASHINGTON, D. C. — The PAW has now completed its administrative machinery for allocating basic materials to the oil industry as a claimant agency under the Controlled Materials Plan.

Details of the procedures to be used by oil operators will be made available within a few days, but the system has already begun to function in a preliminary way.

Inaugurating the new system, Certificate 1 was signed February 27 by Robert E. Allen, assistant deputy administrator, assigning to War Emergency Pipelines, Inc., the quantities of steel and copper which will be required during the second quarter of this year to complete the 24-in. crude-oil line between Norris City, Ill., and New York and Philadelphia. This certificate bore the symbols Allotment P-1501-001; the first standing for PAW as the claimant agency issuing the certificate, 1501 indicating that the project is a crude-oil pipe line, and 001 being the serial number. It assigned a preference rating of AA-1 on 60,000 tons of steel for pipe to be delivered during April and May, and relatively small quantities of copper for brass valves and fittings.

The eastern leg of the line is already under construction and some 400 miles of pipe have been delivered under an allotment for the first quarter previously made by the War Production Board. The Controlled Materials Plan applies only to steel, copper, and aluminum, as other materials are obtained under the old priority system.

Frank A. Watts, director of materials, and Frank Brinegar, chief of the Appraisal and Materials Section of the PAW Transportation Division, watch while Robert E. Allen, PAW assistant deputy administrator, assigns Allotment Certificate P-1501-001 to B. E. Hull, vice president and general manager of WEP, covering materials needed during second quarter of the year for constructing 24-in. crude-oil pipe line between Norris City, Ill., and eastern seaboard

Gulf Intracoastal Barge Ceilings Fixed by OPA

WASHINGTON, D. C. — Specific maximum charges which may be made for barge shipment of petroleum and petroleum products by other than common carriers on the Gulf Intracoastal Waterway were established February 19 by the OPA.

The maximum rates and regulations are based substantially on those which were in effect during March 1942 for the principal operators. The specific ceilings, therefore, will have little effect on cost of petroleum transportation.

The specific rates have been approved by the Gulf Intracoastal Waterway advisory committee to OPA.

The action is contained in Amendment 118 to Supplementary Regulation 14 to the general maximum-price regulation, effective February 19, 1943.

Specific maximum charges are established as follows:

(Rate in mills per net ton per mile)

	Minimum charge 16,000 bbl.	Minimum charge 24,000 bbl.
150 to minus 300 miles:		
Towing only	3.70	3.00
Tugs and barges	5.60	4.50
300 miles and over:		
Towing only	3.50	2.80
Tugs and barges	5.30	4.25

The amendment establishes the maximum charges in terms of ton-miles, which provide a ready method for determining ceilings regardless of whether stops were made at a given point on the waterway in March 1942. The normal rate is based on minimum cargoes of 24,000 bbl. Higher charge is made for shipment in smaller quantities, which is intended to reflect the actual cost to the operators of transporting the smaller volumes.

The maximums specified in Amendment 118 apply when the carrier supplies both tugs and barges. A reduction of approximately one-third is made in the rates when only a towing service is supplied.

OPA explained that the present amendment does not apply to shipments for distances of less than 150 miles. OPA is making a thorough study of the present operating and pricing practices in short hauls and it is anticipated that specific maximums for these will be established when the study is completed.

State Capitals

TEXAS

THE LEGISLATURE this week has before it bills which would permit unitization of oil properties, abolish pipe-line proration, and validate Rule 37 orders of the Railroad Commission.

The bill seeking to eliminate pipeline proration was introduced in the house February 26 by Mr. Sadler of Sweetwater and provides for a $2,000 per day penalty for violations. It makes it obligatory for pipe lines to purchase all oil offered in any amount not exceeding the allowable production of a well or field as fixed by the Railroad Commission.

Purchasers would be forced to comply with provisions of the act through mandatory injunction suits filed in any court by persons, firms or associations injured by violations. Defendants in penalty suits will be barred from pleading necessity due to special refining equipment or processes. The act provides that penalty suits be brought by the state's attorney general or any county or district attorney either in Travis County or in the county in which the defendant resides.

In introducing the bill, Representative Sadler said: "Many pipe-line companies and purchasers of oil have invoked pipe-line proration and have resorted to selective buying which results in injustices, inequities and discrimination and denial of equal opportunity to persons engaged in the same business. Independent operators, especially those in West Texas, have been affected."

The topic covered by the bill has been the cause of frequent complaints by West Texas operators at Railroad Commission hearings where it was claimed that selective buying violated the common purchaser act, which, however, contained no penalties.

The measure introduced by Mr. Sadler will probably come before the committee on oil, gas and mining within 10 days after its introduction.

The committee on oil, gas and mining last week reported favorably (9 to 5) on the Clark bill for utilization of oil leases after hearing arguments by proponents and opponents of the measure. Most of the opposition came from independent producers who claimed it gave the major companies the opportunity to freeze out small operators and still be immune from the antitrust laws. Action on the bill in the house will probably be delayed for some time. In the meantime the bill may be revised to get away from some of the objections raised by the independents.

Sponsors of the Rule-37 validation act claim it is necessary because of the confusion arising out of court decisions affecting oil properties and the uncertainty on the part of some operators as to whether they have legal possession of the production obtained under commission orders.

NET PRODUCTION of 1,501,801 bbl. daily was the allowable set last week for March operations by the Railroad Commission. Gross allowable of 1,589,632 bbl. daily is provided in the new proration schedule but underproduction of 5.97 per cent will account for 87,831 bbl. daily deficiency, leaving the net output 199 bbl. short of the PAW quota of 1,502,000 bbl. daily for the month. Crude is calculated to supply 1,471,207 bbl. of the daily allowable while natural-gasoline and condensate production is estimated at 118,425 bbl.

The March proration order is based on 20 operating days but there are numerous exemptions and modifications of the general order.

Purchasers nominated 1,594,177 bbl. daily in March.

Net allowable of the Gulf Coast area was increased from 288,325 bbl. daily in February to 340,509 bbl. per day in March, a gain or 52,184 bbl. West Texas' allowables were reduced from 216,481 bbl. daily in February to 209,870 bbl. in March. There were no other substantial changes as shown in the accompanying table of district allowables.

District—	March	Feb.
1. Southwest	20,443	20,597
2. Southwest	83,383	82,680
3. Gulf Coast	340,509	288,325
4. Southwest	109,870	109,904
5. East Central	18,498	18,535
6. East Texas	328,290	329,808
6. East Texas (outside)	87,304	87,345
7C. West Central	18,900	18,630
7B. West Central	27,776	27,436
8. West Texas	209,870	216,481
9. North Texas	127,894	126,312
10. Panhandle	98,479	98,739

OKLAHOMA

SPONSORS of a bill (H.B. 144) in the Oklahoma Legislature that would have required renewed filing of all oil and gas lease instruments at 3-year intervals withdrew their support last week, yielding to universal opposition of the petroleum industry, and the issue was declared officially dead.

The bill, which opponents declared would have damaged the oil industry irreparably, provided for refiling all conveyances every 3 years and required filers to pay $5 for each instrument of a value up to $80 and $10 for those valued over $80.

ARKANSAS

OPERATORS in the Magnolia field have been urged to meet voluntarily and discuss means of eradicating the salt-water hazard. In proposing this method of coping with the problem, the Oil and Gas Commission last week informed operators that 13 per cent of the current liquid production from the Magnolia field is salt water. The commission instructed Alec M. Crowell, director, to arrange remedial measures because production of salt water is resulting in a decline in reservoir pressure.

NEW PLUGGING record forms which all operators are required to use for reporting abandoned wells in the state have been issued by the Oil and Gas Commission. The form is a simple one-page declaration of location, name of producing sand, completion record, production record, an estimate of the remaining reserves, and statements on the materials reclaimed from the well, including casing, tubing, rods and surface equipment.

Operators have been instructed to destroy all old Form 5 blanks in their possession and to request supplies of Form 5 (revised) from the commission offices in accordance with their requirements.

MICHIGAN

THE MICHIGAN Oil Advisory board last week tabled a proposal that the state subsidize wildcat oil operations to stimulate exploration. Representatives both of independent and major firms said at the hearing that the industry does not want subsidies and the board urged instead that the federal Government move to increase crude prices.

P. J. Hoffmaster, supervisor of wells, declared a plan advanced by some oil men and legislators apparently would cover only a fifth of the industry. He said it was proposed that the state create a revolving fund of 10 per cent of its revenues from crude oil to be used by wildcatters and that the state pay $1 a foot for wells drilled in return for $3 a foot paid back from wells which struck oil.

"That is based on the assumption every third well will produce," Mr. Hoffmaster said. "Actually it is one producing well in 16 to 20 tries."

the OIL AND GAS JOURNAL

PRODUCTION • TRANSPORTATION
REFINING • NATURAL GASOLINE

Founded in 1910 by
PATRICK C. BOYLE

Oil Industry's No. 2 Job

THE PIWC has an opportunity to render an outstanding service to the oil business and to the entire nation through its postwar organization.

While the industry's war unit centers its activities in aiding to bring about a complete victory it is proper and altogether necessary that it give thought to what must be done that this industry may resume its peacetime activities quickly and effectively once the war is over.

Most of the difficulties of the postwar period will spring from the industry's accomplishments during the emergency. Petroleum's technology has been advanced greatly by the war's requirements. Operators in all divisions will come out of the conflict able to do most things better with many innovations in practices and in products.

These achievements can be made the basis of a greatly expanded industry if properly directed, with the opposite reaction just as certain if a shortsighted and inadequate industrial postwar program is pursued.

The war is bringing facilities to produce 350 thousand barrels or more of high-octane motor fuels daily. What is to be done with these plants and their manpower after the war until such time as there is a demand for this quantity and quality of fuel by motor cars and peacetime aviation?

How is transportation to be adjusted to the "big inch" lines with their lower costs over the smaller lines? A part of this transportation problem will also arise from the fact that if the war continues a year or more there will be excess tanker capacity for a time at least.

Many refiners will have the technical knowledge and plants to do things in their main operations they have never done before and they will also have everything needed in manufacturing methods for the start of a large-scale petrochemical industry. New standards in plant processing practices are inevitable.

The ramifications of these and other war developments which extend to every operator and to every customer, can only be visualized by those who are in close touch with conditions.

Most of these operating accomplishments would have come without a war. But they would have come in such a manner that large and small units would have had time to adjust themselves normally to the new technology. Arriving overnight under the impetus of a war there is danger later of economic and social maladjustments that will end progress instead of expediting it.

An industry-wide approach is mandatory in considering plans. In the postwar period no operator or area is entitled to retain advantages, obtained during the emergency, to the detriment of other operators. Failure to realize that fact will bring confusion and permanent dislocations in operations and will assure the retention of federal controls. The Government incidentally will have a half-billion-dollar or greater oil investment and its orderly liquidation or absorption by operators is not the least of the problems of peace.

The PIWC has the responsibility of leadership in these matters. An equitable program will have the support of the entire industry and of those Washington officials who are friendly to private enterprise. The council's obligations here are second only to the successful carrying-out of the remaining war program.

Refiners Must Help Themselves, W.P.R.A. Told

by Arch L. Foster

SOLUTION for some of their problems, especially that of utilization of catalytic methods in cracking heavy oils to gasoline, may be within the grasp of independent refiners, members of the Western Petroleum Refiners Association were told at a special session in Tulsa, February 26. The potentially acute position of the independent refiner who has no catalytic cracking defense plant to operate and is not likely to have such a plant during the emergency may be relieved if present plans and experimental efforts are successful. The meeting was called to discuss ways and means for meeting this emergency which bids fair to become more serious as time goes on.

The problem is rendered still more serious, particularly in a postwar sense, by the indication that the motor and commercial aviation fuels of tomorrow will be the military aviation fuels of today, declared Wright W. Gary, president of the Filtrol Corp. and formerly director of the PAW Refining Division, in discussing the outlook with refiners. Catalytic cracking has simplified the manufacture of 100-plus octane number aviation fuels for military purposes, he pointed out. The peculiar properties of catalytically cracked fuels resulting from their high content of isoparaffins, naphthenes and aromatic hydrocarbons has improved the base stocks for aviation fuels to such an extent that the available and increasing supplies of alkylate, isooctane and other components will "go further" in the blending of fuels of these extremely high properties now required in ever-increasing volume.

Because of these peculiarly enhanced properties of catalytic gasoline, the solution of the problem is not one which should be postponed until the war is won, in the opinion of the speakers at this meeting. Rather the interim of winning the war is a breathing spell during which the problem may be attacked, employing essentially the equipment now operated by each refiner.

A promising prospect for a solution of the problem now is by the operation known as the suspensoid method, according to Mr. Gary. This method employs a suspension of a solid catalyst in the charge stock. The catalytic action is obtained by heating the suspension under optimum conditions to produce catalytic gasoline, isoparaffinic, isoolefinic and aromatic hydrocarbons in large percentages.

This process has been studied over a period of years by refiners, and is now being used in a 6,000-bbl. unit with reported excellent results. It does not require appreciable additions to the equipment now available in practically every refinery operating a thermal cracking or reforming unit.

Discussion of this proposal to relieve the refiners' situation on cracking developments was presented as a "progress report" rather than as a finished job, Mr. Gary stated. Experimental work is continuing wherever facilities are available and the results to date in this work as well as the production from a large-scale unit show great promise. Mr. Gary asked operators not to consider it as a "cure-all" necessarily but as one means by which refiners may obtain the advantages of catalytic cracking at a time when equipment for the proved processes cannot be obtained.

The outstanding feature of the suspensoid method outlined by Mr. Gary, is the utilization of existing equipment for processing typical charge stocks with few or no additional facilities. It seems necessary, Mr. Gary said, for independent refiners to help themselves in order to avoid the results of crucial developments later. It was stressed that by investigating possible methods of introducing catalysis into operations with existing equipment, refiners will not only gain production of catalytic type of motor fuels during this period but will acquire know-how and experience which will be invaluable.

Wright W. Gary, former director of PAW's Refining Division and now president of Filtrol Corp., urged refiners last week to start work immediately on catalytic-cracking experiments looking to commercial application with existing facilities

Refiners were urged to undertake experimental operations with catalysts, adequate quantities of which for this purpose may be obtained. Further, it has been suggested that groups of refiners correlate their efforts and work out a cooperative plan for investigating this type of operation. The results of pooling interests and information developed by each refiner may, in the mass, result in a satisfactory solution of their mutual dilemma which may well avoid a serious crisis later.

Successful development of such a process is probably contingent on a much cheaper catalyst, probably of the natural rather than synthetic types. Another factor is development of natural catalysts which have greatly increased activity, approaching that of synthetic agents, it was stated at the meeting. Prices of 2 to 3 cents per pound mentioned for catalysts would make possible economical operations even though the catalyst loss might be high. Catalysts of much higher cost would preclude the possibility of an economic operation, unless expensive revivification equipment is installed; it is now impossible to obtain such equipment. Therefore the refiners who study and experiment with this proposition must work essentially with what they have.

Revivification of catalyst may be worked out as a practicable matter in existing clay-burning equipment, is the expectation expressed. Furnaces of the Nichols-Herreshof and other types can be adapted to burn carbon from spent catalysts on a continuous plan. Tentative suggestions of centralized units for regeneration have been mentioned as possibilities.

Operation of catalytic crackers will supply additional amounts of isoparaffins and olefins for processing in refiners' polymerization units. Correspondingly, in peacetime this phase of catalytic-fuel production will be increased over the results obtained in thermal-cracking operations, it was stated. Other methods for improving thermally cracked or reformed gasoline, notably the Cycloversion process just announced by Phillips Petroleum Co., by which cracked distillate is treated catalytically to produce gasoline of high aromatic and cyclic hydrocarbon content, were mentioned as possibilities for enabling refiners to meet future competition.

Allies May Reopen Oil Routes

NEW YORK.—Recent and impending developments in the war zones of Europe, particularly, and in Africa may indicate that a marked improvement in the oil position of the United Nations and a possibly critical impairment in that of the Axis countries will develop in 1943. These developments may result in the reopening of transportation routes to the United Nations thereby improving the currently critical tanker situation and they may bring within bombing range of Russian based aircraft the oil fields and refining areas of Rumania which are vital to the Axis.

In the late summer of 1942, Axis armies reached the banks of the Volga at Stalingrad. The Volga constitutes European Russia's most important inland transportation route and one of the principal products which it carried was oil from Baku on the eastern shore of Caspian. Because of the importance of Baku, which normally produces some 70 per cent of Soviet oil, German control over the Volga was a severe blow to Russia.

The severity of this blow is indicated by estimates of Russian production as given by Basil B. Zavoico of the Chase National Bank at the A.I.M.E. meeting in New York last month. Mr. Zavoico's estimates of daily average production follow:

District—	1942	Present	1941
Trans-Caucasus*	410,958	350,000	473,000
Grozny-Daghestan	23,973	20,000	37,000
Kuban-Maikop	20,548	0	41,000
Ural-Volga	116,438	125,000	75,000
Emba	15,068	15,000	12,000
Asia (Central)	23,972	25,000	15,000
Sakhalin	12,329	12,500	9,000
Total	623,286	547,500	662,000

*Principally Baku.

It will be noted that the production of the Caucasian fields from Baku to Maikop at present is 35 per cent below 1941 levels. The devastated Maikop fields are, of course, yielding nothing at present and the Grozny fields, which German armies reached and penetrated slightly, have been cut almost in half. The severance is attributed to the fact that much of the Grozny production normally moves westward through a pipe-line system terminating in the eastern Ukraine. This system fell into the hands of the Germans after, undoubtedly, it had been rendered useless by retiring Red armies.

The big decline for this region was in Baku which fell off 123,000 bbl. in daily output, about 26 per cent. Before the Axis gained a measure of control over the Volga, Baku oil moved up the Caspian to Astrakhan and thus was distributed via the Volga through central and western Russia. Virtually all of the lower Caucasian oil moved along this route, the principal exception being that which was transported to Batum through twin pipe lines. German domination of the north and west shores of the Black Sea reduced the value of these lines. It is probable that they have been limited to supplying the needs of the Red fleet in the Black Sea and possibly some exports to Turkey.

According to the Soviet newspaper Pravda, workers are now rehabilitating the recaptured Maikop fields and they are expected soon to be producing their first oil after 7 months.

Volga Artery Regained

Success of the Russian armies in driving the Axis out of the Caucasus and away from the Volga regained for them the Maikop fields, the Krasnodar refinery and the pipe-line system of the western Caucasus and also reopens the Volga to normal traffic when it again becomes ice free this spring. This may result in a reduction of the demands on the United States and eliminate some of the tanker transportation by way of the dangerous northern route to Murmansk. By means of the river's supplementary canals, oil can be transported as far north as Leningrad.

The other potentially significant development in the advance of the Red armies is their approach to within bombing distance of the oil fields and especially the refineries of Rumania. In another paper before the A.I.M.E., V. R. Garfias and R. V. Whetsel of Cities Service Oil Co. and J. W. Ristori point out that the petroleum situation of the Axis countries in Europe is in close balance. They stressed further that "Rumanian crude production, which constitutes over 35 per cent of the whole European Axis output, is confined to a small area, definitely known, where continuous bombing could within a short time make effective inroads upon the German oil supply."

When the Soviets recaptured Lozovaya, the rail junction south of Kharkov, they were about 500 miles from Ploesti, the center of the Rumanian oil industry. This distance compares with the 600 miles flown by Royal Air Force bombers from England when they blasted Genoa and readily illustrates the vulnerability of this strategic military target. A concerted attack such as those which were visited on Genoa and Turin would wreak almost irreparable damage to the German oil supply, the importance of which can hardly be overstressed.

If, as many military observers believe, the Reds are not stopped short of the Dneiper, Ploesti will be within considerably easier reach. Dneiperpetrovsk, first probable Dneiper River goal of the Russian advance because of its importance and location, is approximately 425 miles from Ploesti. If the Russians succeed in driving the Germans beyond the Dneiper in the south and reach its mouth on the Black Sea they will be less than 300 air miles from the heart of the Rumanian industry. The United Nations appreciate the value of Rumania to the Axis from an oil standpoint as was apparent from the air raids made

Refueling and replenishing ammunition in a Soviet military plane, a phase of the Red Army's drive to bring Rumanian petroleum supplies within bombing range

on the Ploesti area by Russian airmen following Germany's invasion and by the air raid made last fall by American airmen on that country. Both of these attempts were made under much less favorable conditions than may obtain if the Russians are able to maintain their advanced bases or to extend them and it is highly probable that the long expected bombing of oil objectives in Rumania will be undertaken soon.

The third encouraging possibility lies in the complete ejection of the Axis forces from Africa. This would give the United Nations sufficient control of the Mediterranean to ship oil westward from Palestine and Egypt by tanker. Refineries at Haifa, Palestine, and Suez, Egypt, have a crude-oil capacity of 60,000 bbl. per day which is more than sufficient for normal local needs. If only one-third of this is available for shipment westward it would help considerably because the tanker distance from New York to Tunis is treble that from the eastern Mediterranean.

Germany's Lack of Lube Oils Hampering Military Operations

WASHINGTON, D. C.—Failures of the Germany Army in Soviet Russia, according to expressions from high petroleum authorities released here last week, are because of the lack of oil. Insufficiency of supplies is aggravated by inferior qualities of lubricating oil derivable by the Nazi from central and western European sources.

Since the outbreak of the European war, oil men, correspondents and economic observers have contended that sooner or later the lack of low cold-test lubricating oil would prove a fatal deficiency in German supplies. A desperate attempt to overcome this glaring deficiency was halted considerably short of Baku which produces crude particularly well suited for manufacture of low cold-test lubricants indispensable to winter operation of mechanized military equipment.

Testimony presented here recently by Bruce K. Brown, Robert E. Allen, and E. DeGolyer, assistant deputy petroleum administrators, and made public last week by the House deficiency committee, tends to confirm and amplify opinions previously expressed that Germany's petroleum shortages are at last throttling the Nazi war machine.

The chief supply Germany has, Mr. DeGolyer told the committee, is the Rumanian fields. He estimated production from Rumania at "a little over 100,000 bbl. a day," probably 5,000 to 10,000 bbl. daily from Austria and Hungary and possibly another 5,000 to 10,000 bbl. per day from Poland and 5,000 bbl. daily in Germany itself.

The House committee disclosures did not amplify Mr. Brown's belief that Germany's setback in Russia could be assigned to the lack of oil. But other sources of information in recent weeks have been more specific on this point. Subzero temperatures along much of the winter front demand low cold-test lubricating oils for use in all varieties of motorized military equipment. Without proper lubricants, the number and operating scope of military equipment upon which German positions depended have been seriously retarded. Conversely, Soviet equipment, lubricated with oils qualified to protect engines under such severe weather conditions, have presented an unstoppable combination to the retreating Nazis.

German production of synthetic motor fuels was estimated at 100,000 bbl. daily by Mr. DeGolyer. Synthetic fuel, along with gasoline produced from Rumanian, Austrian, Hungarian and Polish crudes, along with large stocks at the start of the war, sustained German military operations during the first few years of war. Many analysts now, however, consider that Germany's supplies and consumption are in close balance and that this accounts for the sporadic nature of Nazi activity in all war fronts.

Injunction Jeopardizes East Texas' Water Plan

AUSTIN, Tex.—The Texas Railroad Commission received a setback February 27 in its efforts to control production in the state when Judge J. D. Moore of the Ninety-eighth District Court at Austin granted an injunction preventing the commission from enforcing its order establishing an oil-water ratio in the East Texas pool. The injunction was granted to the Konawa Operating Co., owner of some of the properties on which production was curtailed by the order.

The working majority of the Railroad Commission, Beauford Jester and E. O. Thompson, announced that the decision would be appealed and the order would be enforced in the meantime. Attorneys for the Railroad Commission were preparing the appeal.

The original water-oil ratio order was issued after a succession of hearings devoted mainly to an allowable-transfer plan. Operators with high water-oil ratio wells were authorized to shut in such properties and take the allowable from other wells. The order restricted wells to a production of 10 bbl. of water for each barrel of allowable oil, or 200 bbl. per day. A well with a water-oil ratio of 40 to 1 was restricted to 5 bbl. of oil and 200 bbl. of water per day.

On the day the order was to go into effect, Konawa Operating Co. filed an injunction suit and the Railroad Commission announced it was postponing effective date of the order until tests on affected wells were completed. After completion of the tests, the order became effective in January and the injunction suit came up for hearing, several weeks being required for the testimony.

Opponents of the measure claimed that it virtually confiscated properties and that it was contrary to the marginal-well statute. The commission contended that the minimum-well law did not affect the rule as a method for complying without penalty was available to the operators.

As soon as the order was issued in December of last year many operators began to inject salt water or to make arrangements for others to put the water back in the Woodbine sand for them. The East Texas Salt Water Disposal Co. quickly revised its plans so that it could go into operation immediately on a large scale. Originally its intentions had been to drill injection wells outside the producing area but it began acquiring depleted oil wells for conversion to injection wells. It was able to more than double its injection scheduled for February 1, and at present has a salt-water injection capacity of 100,000 bbl. per day through its 12 systems.

On February 20 there were approximately 140,000 bbl. salt water daily (80,000 through company systems and 60,000 by the East Texas Salt Water Disposal Co. systems) being returned to the Woodbine sand and approximately 75,000 bbl. shut in. Both injected water and shut-in water carry an oil bonus. The total of 215,000 bbl. of water energy being conserved is an all-time high for the pool. Results of the water conservation were shown by the bottom-hole-pressure figures on the field for January, released last week, which showed an increase of 4.84 lb.

The East Texas field occupies a place of strategic importance in the nation's oil picture today and is the starting point for the WEP 24-in. pipe line. It was expected that considerable increase in production in the East Texas field might be required to help supply crude for that line.

PIWC Hears East Coast Petroleum Supply Is About 'Over The Hump'

WASHINGTON, D. C. — The East Coast supply situation is over the hump and except for residual fuel oil there should be only local shortages the balance of the heating season, the Committee on Petroleum Economics reported to the Petroleum Industry War Council at its meeting here March 2.

The committee said some relaxation of restrictions on pleasure driving could be made as soon as heating-oil stocks are built up. Improvement in the situation is due to greater deliveries than anticipated, while lower consumption has permitted a slight rise in East Coast stocks.

The committee had intended to present a detailed report on supply and demand for the entire United States, but figures were not available so the following memorandum report was submitted:

"It was not possible for the subcommittee to prepare the long-term report contemplated for this month's meeting of the council due to lack of availability of revised figures for military requirements, which, however, will be available for next month's report. With civilian demand rationed, the military requirements will be the controlling element in the next forecast, which will cover the remainder of this year and the first quarter of 1944. The staff of the subcommittee is working with the Foreign Division of the PAW in the development of a foreign-supply-and-demand program, from which it will be possible to derive the military requirements to be supplied from various parts of the United States over this period.

"While local shortages will still have to be contended with during the month of March, particularly on kerosene, distillate and residual fuel oil, it is believed that we are 'over the hump,' and that, on the whole, except for residual fuel oil, even local shortages should be avoided after early March.

"One of the reasons for the improvement in the situation has been the greater deliveries into District 1 over those previously anticipated. The improvement in the stock position is greater than would be indicated from the increase over anticipated supplies, which is accounted for by the fact that demand, made up of essential civilian plus military requirements, has not been as high as anticipated.

"With the completion of the winter season by April 1, current supplies will considerably exceed current rationed demand, due both to the falling off of peak winter fuel-oil consumption, and additions to transportation facilities, so that greater quantities will be available for military export from the Atlantic seaboard and for building up stocks. The problem will then become not one of transportation, but one of proper distribution of the total volume available between products in proper relation to civilian and military consumption requirements.

"There is, in Districts 1, 2 and 3, a definite tendency towards overproduction of gasoline and underproduction of kerosene, distillate and residual fuel oils, particularly the latter. Stock levels of gasoline in both Districts 1 and 2 are above necessary minimum working levels, while in both districts stocks of residual fuel oil are below desired minimums. In District 3 stocks of gasoline are at high levels, causing serious inflexibility in war-product production, whereas stocks of residual fuel oil are close to minimum requirements. Preliminary forward estimates for the remainder of this year indicate that unless refinery yields in all three districts are markedly adjusted, there will be serious overproduction of gasoline and underproduction of fuel oils necessary to meet export-military requirements, and to build adequate stocks of fuel oil during the coming summer to meet next winter's demand.

"Last October, at the time of the announcement of nation-wide gasoline rationing, the committee pointed out the drastic changes in refinery yields that would be necessary to supply requirements of kerosene, distillate and residual fuel oils with gasoline demand curtailed under rationed conditions. While some adjustments of yields have taken place since that time, it is apparent from the present stock situation that these adjustments have been inadequate. The primary reason why the necessary adjustments have not been made has been the lack of adjustment in the rigid product price ceilings to encourage the production of fuel oils at the expense of gasoline.

"Recently the OPA made provision for adjustment in fuel-oil prices in certain areas in the western part of District 2 and the northern part of District 3 to encourage residual fuel-oil production at the expense of gasoline to meet railroad consumption requirements.

"The committee must repeat that the problem is much broader than the relatively small area covered in the recent OPA action, and that there must be a general increase in fuel-oil production at the expense of gasoline throughout Districts 1, 2 and 3. This is especially true of the situation on the Gulf Coast and Atlantic seaboard, where action must be taken if adequate fuel-oil supplies are to be made available for necessary seasonal-stock increases and to meet export fuel-oil requirements.

"The gravity premium necessary to stimulate residual fuel-oil production can be determined for any specific situation with a relatively high degree of accuracy. The gravity-premium method which the committee has for some time advocated as the most effective and equitable means of providing an incentive for increasing fuel-oil production, can be applied on any existing level of overall product prices."

Three Members Added to PIWC Economics Committee

WASHINGTON, D. C.—Three new members have recently been added to the Committee on Petroleum Economics of the Petroleum Industry War Council. They are John A. Brown, Frank Phillips and William F. Humphrey.

The enlarged membership of the committee is now as follows:

Dr. Robert E. Wilson, chairman, Pan American Petroleum & Transport Co., New York; Col. J. Frank Drake, president, Gulf Oil Corp., Pittsburgh, Pa.; W. H. Ferguson, executive vice president, Continental Oil Co., Denver, Colo.; John D. Gill, Atlantic Refining Co., Philadelphia, Pa.; A. Jacobsen, president, Amerada Petroleum Corp., New York; A. C. Mattei, president, Honolulu Oil Corp., San Francisco, Calif.; J. Howard Pew, president, Sun Oil Co., Philadelphia, Pa.; Charles F. Roeser, president, Roeser & Pendleton, Fort Worth, Tex.; John A. Brown, president, Socony-Vacuum Oil Co., Inc., New York; Frank Phillips, chairman, Phillips Petroleum Co., Bartlesville, Okla.; William F. Humphrey, president, Tide Water Associated Oil Co., San Francisco, Calif.; and Fred Van Covern, secretary, New York.

Revisions Account for Higher A.P.I. Reserves

NEW YORK.—The petroleum industry found 1,878,976,000 bbl. of new oil during 1942, or 493,497,000 bbl. more than the 1,385,479,000 bbl. of crude oil produced during the year, the American Petroleum Institute's Committee on Petroleum Reserves announced February 27.

The net increase raised total known underground reserves of petroleum as of December 31, 1942 to 20,082,793,000 bbl. Total reserves on January 1, 1942 were 19,589,296,000 bbl. These estimates include only the reserves known or blocked out in proved fields, and recoverable by present production methods.

Most of the new oil was added through upward revision of proved reserves in fields found prior to 1942. Further development of these older fields revealed a net addition of 1,618,925,000 bbl. of crude oil which had not been included in previous estimates for those fields but which is now indicated by additional development information.

The committee stressed the fact that its estimates of reserves do not reflect the availability or the rate at which these reserves can be produced.

A comparison of the A.P.I. estimates with those of The Oil and Gas Journal will be found on page 69 of this issue. The two estimates are within 3 per cent of agreement as to total proven reserves and the estimates of new oil added in 1942 are within 6 per cent of one another.

"For instance," the committee stated, "arbitrary division of the known reserves by a current rate of production or by any anticipated rate of consumption is obviously incorrect" and that "as a matter of fact, today's known oil can be recovered only over a period of many years and at gradually declining rates, as has been widely demonstrated by past performance under all kinds of operating conditions."

Development of Basic Data

Basic data for the report were developed by a number of subcommittees of experienced geologists and petroleum engineers in all important oil-producing areas. The Institute committee signing the report included: J. Edgar Pew, chairman, Sun Oil Co., Philadelphia; R. F. Baker, Texas Co., New York; D. V. Carter, Magnolia Petroleum Co., Dallas, Tex.; Frank R. Clark, Ohio Oil Co., Tulsa; Alexander Duessen, consulting geologist, Houston, Tex.; G. Clark Gester, Standard Oil Co. of California, San Francisco, Calif.; F. H. Lahee, Sun Oil Co., Dallas; J. M. Sands, Phillips Petroleum Co., Bartlesville, Okla.; Fred Van Covern, American Petroleum Institute, New York; Theron Wasson, Pure Oil Co., Chicago, Ill., and Fred E. Wood, Standard Oil Co. (Indiana), Chicago, Ill.

ESTIMATED PROVED PETROLEUM RESERVES IN THE UNITED STATES
(Barrels of 42 U. S. Gallons)

	Proved reserves as of January 1, 1942 (December 31. 1941)	Proved new reserves (discoveries, extensions and revisions) in 1942*	Production during 1942 (Bureau of Mines preliminary)	Proved reserves as of December 31, 1942 (Cols. 1+2 less 3)
	(1)	(2)	(3)	(4)
Arkansas	295,017,000	31,637,000	26,628,000	300,026,000
California	3,323,147,000	121,025,000	248,326,000	3,195,846,000
Colorado	23,443,000	18,220,000	2,220,000	39,443,000
Illinois	333,714,000	79,520,000	106,456,000	306,778,000
Indiana	22,873,000	15,643,000	6,743,000	31,773,000
Kansas	689,795,000	94,816,000	97,636,000	686,975,000
Kentucky	36,450,000	2,675,000	4,472,000	34,653,000
Louisiana	1,330,134,000	227,718,000	115,726,000	1,442,126,000
Michigan	55,620,000	29,977,000	21,754,000	63,843,000
Mississippi	80,207,000	—10,477,000†	28,833,000	40,897,000
Montana	86,124,000	7,508,000	8,074,000	85,558,000
Nebraska	4,014,000	—600,000†	1,237,000	2,177,000
New Mexico	674,817,000	34,224,000	31,544,000	677,497,000
New York	59,816,000	none	5,421,000	54,395,000
Ohio	37,404,000	1,160,000	3,543,000	35,021,000
Oklahoma	1,035,820,000	73,797,000	140,690,000	968,927,000
Pennsylvania	170,897,000	none	17,779,000	153,118,000
Texas	10,975,641,000	1,053,457,000	483,371,000	11,545,727,000
West Virginia	50,011,000	750,000	3,574,000	47,187,000
Wyoming	304,053,000	97,911,000	31,392,000	370,572,000
Miscellaneous‡	299,000	15,000	60,000	254,000
Total U. S.	19,589,296,000	1,878,976,000	1,385,479,000	20,082,793,000

*This column includes proved reserves discovered in new fields plus proved reserves added by extensions of pools only partly developed a year ago, plus or minus any revisions in former estimates. Only a limited area is assigned to each new discovery even though the committee may believe that eventually a much larger area will produce, for in this report we are concerned only with actually proved reserves.
†No discoveries; previous estimates revised downward.
‡Includes Tennessee, Missouri, Utah and Virginia.

Foreign Oil Committee Formed of Several Agencies

WASHINGTON, D. C. — Petroleum Administrator Ickes last week announced the formation of the foreign petroleum committee composed of representatives of the federal agencies for the purpose of coordinating the functions of the various branches of government in relation to foreign oil activities.

The petroleum administrator invited the following agencies to become members of the committee: Department of State, Department of War, Navy Department, Board of Economic Warfare, Office of Lend-Lease Administration, Office of the Coordinator of Inter-American Affairs, and War Shipping Administration.

At the organization meeting, held February 25, the following attended: Dr. Herbert Feis and his alternate, Max Thornburg, of the State Department; Brig. Gen. Walter B. Pyron, of the War Department; Capt. T. L. Padgett, Jr., appearing for Capt. A. F. Carter of the Navy Department; John Cowles, appearing for H. C. L. Miller, of the Lend-Lease Administration; Brewster Jennings, of the War Shipping Administration; Joseph Rovensky, Office of the Coordinator of Inter-American Affairs; Sumner Pike, of the Office of Price Administration; Deputy Petroleum Administrator Ralph K. Davies, E. DeGolyer, J. Terry Duce, and John H. Thacher, Jr., all of PAW.

Humble Modifies Buying Policies in Two States

AUSTIN, Tex.—Pipe-line proration in two Texas districts and in New Mexico was lifted last week by Humble Oil & Refining Co. The purchaser notified Beauford Jester, chairman of the Railroad Commission, that it is prepared to buy 100 per cent of the allowables from wells to which its affiliated pipe lines are connected in Southwest Texas and 95 per cent of the quotas in West Texas and New Mexico.

Federal Order Digest

PAW Orders

Drilling—PAO 8: Limits drilling to one well to each 160 acres in the Barnhart field in Reagan County, Texas; specifies one well to a quarter, to be within 150 ft. of the center of the southeast quarter of quarter section, effective February 22.

Drilling — PAO 9: Prohibits use of any materials to drill, complete or provide additions to any natural-gas wells in Carson, Collingsworth, Gray, Hansfield, Hartley, Hutchinson, Moore, Potter, Sherman or Wheeler counties, Texas, effective February 24.

Price Administration

Crude Oil — RPS 88, Amendment 71: Increases ceiling 15 cents per barrel on crude from 20 Wyoming fields producing black oils, effective February 26.

Diesel Oil—RPS 88, Amendment 75: Sets cents per gallon bulk maximum prices for distillate diesel oil of 28 gravity and above at Mobile, Ala., Pensacola, Panama City and Port St. Joe, Fla., effective March 1.

Transportation — GMPR, SR 14, Amendment 118: Establishes maximum charges which may be made for barge shipment of petroleum by carriers other than common carriers on the Gulf Intracoastal Waterway, effective February 19.

Iron and Steel Resale — RPS 49, Amendment 12: Reduces warehouse maximum prices of secondary iron and steel products from 10 to 35 per cent, effective March 1.

OPA Rationing Orders

Gasoline—RO 5c, Amendment 24: Allows dealers and distributors in East, holding unidentified ration coupons redeemed on or before November 30, 1942, to get exchange certificates from local boards before March 11, effective March 1.

Gasoline — RO 5c, Amendment 25: Authorizes farmers to obtain gasoline for tractors, engines and other nonhighway equipment for period of 6 months, instead of previous limit of 3 months, effective March 2.

Gasoline — RO 5c, Amendment 26: Extends deadline for depositing any A-3 coupons in hands of licensed and intermediate distributors to March 20, issued February 27.

Fuel Oil — RO 11, Amendment 39: Relaxes ban against issuing permanent fuel-oil rations for heating stoves bought since last July, effective March 2.

Stoves—RO 9, Amendment 2: Liberalizes restrictions to permit householders to buy, under certain circumstances, new oil stoves, effective March 2.

Fuel Oil—RO 11, Administrative 1: Provides for issuance of additional ration coupons equal in value to the heating oil burned during the registration of consumers for Ration Book 2, between February 22 and 27, in 17 eastern states and the District of Columbia, effective February 22.

Tires—RO 1a, Amendment 13: Reserves "war" tires (made new of reclaimed rubber) for replacements on cars with a mileage ration of more than 560 monthly, effective March 1.

Truck Tires—March allocation: Reduces quota of truck tires to 299,000 for month; increases recapping quota to 460,000 during month, effective March 1.

New Passenger Cars — RO 2: Revoked, except violations previously incurred, effective March 6.

Passenger Cars — RO 2b: Expands eligibility list for rationing of all new passenger automobiles and liberalizes rules for the rationing of convertibles, 1941 models and cars in the higher-price brackets, effective March 6.

WPB Priority Orders

Butadiene Plant — Revokes priority assistance extended to Pan American Refining Corp., refinery-conversion project at Texas City, Tex., issued February 26.

Drilling Mud — CO M-277: Grants permission to use quebracho and urunday extracts in oil wells, issued February 26.

Heat Exchangers — Requires prospective buyers to apply for "authorization to purchase" on Revised PD-615, combining previous functions of forms PD-615 and PD-615a, issued February 24.

Heat Exchangers—GLO L-172: Predicts manufacture of over 200 million dollars worth of heat exchangers in 1943, provides for close scheduling, issued February 22.

Control Instruments — GLO 1-272: Simplifies and standardizes control valves, liquid-level controllers, pyrometers and resistance thermometers, effective February 22. (Where L-272 overlaps L-134 the less restrictive will govern.)

Oxyacetylene Apparatus — GLO L-268: Provides that no manufacturer or dealer shall accept or deliver purchase orders bearing preference ratings lower than AA-5; specifies parts or portions of apparatus that may not be made of nonferrous metals or stainless steels, effective February 24.

Steel Shapes—GLO L-211, Schedules 4, 5, 6 and 7: Tightens limitation on the manufacture of steel-mill products to minimum number of varieties which will satisfy current needs, effective February 24.

Hand Tools—GLO L-157, Schedule 4: Curtails the number of products permitted to be manufactured in move to reduce inventory stocks in distributors' and dealers' hands, effective February 25.

Decentralization — Effective March 1, applications for priority assistance on Form PD-1a must be filed with the nearest of 131 WPB district offices; authorizes 12 Regional WPB offices, beginning March 15, to assign ratings on PD-1a's valued at $100 or less.

Transportation Orders

Commercial Vehicles — ODT 21, Amendment 5: Enables ODT to order control over commercial vehicles transferred from one carrier to another, effective February 24.

A.P.I. Southwestern District Meeting Dates Are Set

HOUSTON, Tex. — The regular spring meeting of the southwestern district, A.P.I. Division of Production, will be held here April 29-30, it was announced last week by R. O. Garrett, chairman.

Decision to hold the meeting in April was made on recommendation of the central committee on district activities.

The program committee appointed by Mr. Garrett is composed of D. V. Carter, Magnolia Petroleum Co., Dallas, Tex., chairman; A. W. Baucum, Texas Co., Houston; Harold Decker, Seaboard, Oil Co., Corpus Christi; George H. Fancher, University of Texas, Austin; L. W. MacNaughton, DeGolyer & MacNaughton, Dallas, and M. A. Wright, Carter Oil Co., Shreveport, La.

Pacific Coast Division of A.P.I. to Meet March 23

LOS ANGELES, Calif.—The annual spring meeting of the American Petroleum Institute, Division of Production, Pacific Coast district, will be held Tuesday evening, March 23, in the Los Angeles Biltmore Bowl.

It will be a dinner meeting, beginning at 6 p.m. Title of the program will be "California Petroleum Production for War." Several speakers, headed by E. E. Pyles, coordinator for the California Conservation Committee, will address the meeting.

Guest speaker will be Herbert R. Gallagher, recently appointed director-in-charge of the District 5 Pacific Coast office of the Petroleum Administration for War. E. K. Parks, chairman of the Pacific Coast district, Division of Production, will preside.

The morning and afternoon technical sessions, held in prior years, have been suspended.

Oil Attracts New Capital From Producers of Military Supplies

by W. V. Howard

ADDITIONAL reports over the past week point to an increasing flow of new capital into the exploratory and drilling divisions of oil operations chiefly from concerns engaged in the production of military supplies and equipment. In some instances the companies concerned have been engaged in preliminary operations for several months or longer. The scope of their activities has recently been expanded so that they have attracted general attention within the oil industry.

Officials of the companies stress the fact that the new capital does not come entirely from war profits. In most cases the companies were engaged in defense work previous to Pearl Harbor and also carried on manufacturing operations connected with peacetime goods, before turning over their plants to the production of military materials. It is explained that the companies desire to maintain their organizations after the war and have turned to the oil industry as a logical field of activity. Profits are being invested at this time as the start in permanent operations.

Source of Capital

Within the petroleum industry it has been claimed by some that this arrangement permits these concerns to invest capital which would otherwise be subject to high excess profit taxes. This means in effect, it is claimed, that these newcomers can carry on exploratory operations on a more attractive basis than most oil companies.

Regardless of the motives drawing this new capital into the business of drilling, it is being expended freely on wildcatting and augments that which has been made available by major companies and independents for that purpose. In this respect, at least, it is furthering the desires of PAW for more wildcatting and it remains to be seen whether or not old-time operators have been wiser in not taking the same chances.

Two of the companies recently reported as being active in the oil business have already been called upon to return funds to the Government on renegotiations of contracts but this is not believed to have any connection with their oil activity as all contracts with the Army and Navy are subject to similar action.

Among the companies attempting to maintain their corporate entity after the war through participation in the oil industry is Auto-Ordnance Corp. (The Oil and Gas Journal, January 7, 1943, p. 34) which has been very active in Kansas and is also becoming interested in drilling in Texas. Another comparative newcomer is Northern Ordnance, Inc., of Minneapolis, Minn. This company is one of four operated by John B. Hawley, Jr., whose Northern Pump Co. has been in the oil-equipment supply business for some time.

Northern Ordnance Operations

Last fall, Mr. Hawley started operations in Badger Basin and near Elk Basin in Wyoming and when Northern Ordnance entered the business, he transferred these wells to the latter organization.

Recently, Northern Ordnance purchased several blocks of leases from Carter Oil Co. Locations have been decided on for several wells although work has actually started on only one, where Olson Drilling Co. of Tulsa is moving in on SE SE 28-22n-17w, near Driscoll, in Woodward County, Oklahoma. This is a 9,750-ft. test to the Wilcox. Contracts have been let to the Beacon Drilling Co. of Tulsa for two tests in Beckham County, Oklahoma. These are in NW SE 29-9n-22w, in the Sayre gas field and SE NE 35-10n-23w, north of Sayre. Both tests are scheduled to go to 6,000 ft. in the Caddo formation.

In Kansas, contracts have been let for four tests, two in Phillips County and one each in Mitchell and Saline counties. Contracts have been awarded to the Mercury Drilling Co., Tulsa, for a well in SE SE 23-3s-20w and to Holm Drilling Co. for a test in SE NW 27-3s-17w, west and east of the Dayton pool, respectively. Along the west slope of the Salina basin, a test will be drilled by Crow Drilling Co., Shreveport, La., in SE SW 35-8s-9w and by Parker Drilling Co., Tulsa, in SE NE 10-15s-3w.

Northeast of the Willow Lake pool in Concordia Parish, a test will be drilled by Blackstock Bros., Shreveport, La., in SE NE 9-7n-7e. Olson Drilling Co., Tulsa, has been awarded the contract for a Devonian test, offsetting an Aux Vases producer in the Xenia pool, SW SE 5-2n-53, Clay County, Illinois, and bids have been requested for another Devonian test in NE NE 28-9n-1e, Fayette County, Illinois. It is reported that other locations will be made in the near future.

These wells are all to be drilled on acreage acquired from Carter, which company has retained considerable acreage in the blocks which it had previously acquired. In order to ensure that the maximum benefit accrues from the drilling of these wells and since Northern Ordnance has not recruited a full geological and engineering staff, Carter has agreed to supervise the drilling of any wells which Northern Ordnance may decide to drill on these tracts. For this service Carter obtains a set fee.

Organization of Company

Oil operations of Northern Ordnance, Inc., are under the direction of H. L. Scott with A. I. Levorsen, acting as consulting geologist. Headquarters are in Tulsa. Announcement of all of these locations at one time has given the impression that the company has embarked on a whirlwind wildcatting campaign. Actually the decision to drill most of these locations was made after considerable study of the possibilities of the areas following seismograph, surface geological and subsurface stratigraphic investigations and actual drilling of some of them may not begin for some time. Like Auto-Ordnance, Northern Ordnance is taking full advantage of highly trained technical assistance and contemplates being in the oil business indefinitely.

Among other outside interests who are reported to be entering the oil industry are the Sharples Corp., with properties in the Barnhart area, Reagan County, Texas, and the Baroil area of southern Wyoming; Alco Valve Co. and Aero Parts Co. with interests in Kansas and northern Oklahoma; and DeKalb Agricultural Association which this week was reported drilling an outpost well southwest of the Means pool in Andrews County, Texas, and has just completed a producer in the Wasson field.

DEATHS

Howard D. Atha, 67, president of Gordon Oil Co., Mount Pleasant, Mich., died February 23 at Battle Creek where he was under treatment. He was founder and four times president of the Michigan Oil and Gas Association. After founding Gordon Oil Co. at Columbus, Ohio, in 1919, Mr. Atha moved his operating headquarters to Michigan in 1925 and had lived at Mount Pleasant since that time. Survivors include the widow; a daughter, Mrs. Georgia Callahan of Cincinnati, Ohio, and a son, Edwards, serving in the Army Air Forces.

Harry G. Seidel, European representative of Standard Oil Co. (New Jersey), coordinator of marketing outside the United States and Canada, was lost in the crash of the Yankee Clipper at Lisbon, Portugal, on February 22. He was 52 years old. Mr. Seidel, a native of Fitchburg, Mass., and a graduate of Brown University, had been with the company for 33 years. He had made numerous flights across the Atlantic and was returning to his post in London when the ill-fated Clipper plunged into the Tagus River. In 1919 he went to Rumania where he became managing director of Romano-Americana. Subsequently he headed the Standard-Nobel in Poland.

John J. Bacigalupi, 75, builder of one of Los Angeles, Calif.'s first refineries, died last week at his California home.

Francis J. Henderson, 72, died at Toronto recently. A native of Petrolia, Ont., he was at various times employed by British oil companies to drill in Austria, Africa, Java and Borneo.

Robert E. Menzie, 88, died at Toronto. He early became connected with the oil industry at Petrolia, Ont., and in 1883 became manager of the Producers refinery there, subsequently engaging in industrial enterprises at Toronto, including the White Star Oil Co. at Oakville from which he retired 10 years ago.

L. B. Boggs, driller for Prince Brothers Drilling Co., of Electra, Tex., was found dead in his bed at his hotel in Corsicana February 25.

Maurice W. Parker, oil-run clerk for Humble Pipe Line Co. in Houston, Tex., when he entered military service last November 14, has met death "in the area of North Africa," according to notice received from the War Department by Mrs. Parker. Mr. Parker was one of about 58 Humble technicians who enlisted in a petroleum engineering outfit, and he soon was advanced to technical sergeant. His mother, Mrs. G. W. Parker, resides in Eagle Lake, Tex. Circumstances of the death were not given.

William M. Potts, 72, a retired engineer for Magnolia Petroleum Co., died Sunday at Houston, Tex., at the home of his daughter. He went to Houston in 1908, and retired in 1937. His wife and a daughter survive.

Charles Walker, 32, construction worker for Southport Petroleum Co., Texas City, Tex., died last week as the result of an accident. His wife and three children survive.

David Gilmore Maxwell, 72, died recently in Dallas, Tex., following a short illness. He was a drilling contractor and resided at Bartlesville, Okla., and Dallas.

Ernest Flanders, 61, oil-field worker in the Bradford, Pa., field for many years, died recently at a Bradford hospital. Death followed a stroke which occurred after he had undergone surgery. He was associated with Towne & Melvin Oil Co., at Rixford, Pa. His widow, three sons and two daughters survive.

Frank Mayes Bowser, 65, veteran oil producer and newspaperman, died at his farm home near Franklin, Pa., last week, after an attack of heart disease. He had been an oil producer for many years and was in partnership with Carl Smith, of Clintonville, Pa., in the ownership and operation of a number of oil leases.

Frank T. Colby, 54, died of a heart attack last week in a Tulsa hospital. He was a former employe of the land department of Carter Oil Co. His widow survives.

George H. Lewis, 68, of Mineral Wells, Tex., died recently at Electra, Tex. Mr. Lewis had worked as farm boss for Magnolia Petroleum Co. for 27 years, retiring 5 years ago.

George Gale Lang, 64, a retired oil driller, died recently while en route from his home in Tulsa to a hospital. He had lived in Tulsa for nearly 30 years. He retired from the oil business 5 years ago, after seeing service in many Oklahoma fields. His widow survives.

John Urban, veteran employe of National Transit Pump & Machine Co., Oil City, Pa., died after a 2-month illness. His widow survives.

G. H. McCarty, 69, driller in the Bradford oil field, died recently at a Bradford hospital, following a surgical operation. He had been an oil-well driller for many years. His wife, a son and a daughter survive.

Henry P. Fennimore, 62, oil-well driller of Amarillo, Tex., died in a hospital at Albuquerque, N. M. He is survived by his wife, two sons and three daughters.

Questionnaires Cost Pure 10 Per Cent Of Net Profits

CHICAGO.—Between 8 and 10 per cent of Pure Oil Co.'s net earnings last year represent cost to the company of preparing the "mass of uncoordinated, immaterial and irrelevant data" required by the "compilation of statistics, questionnaires and information asked by government authorities, quasi-government agencies and industry committees." This estimate was made here last week by Henry M. Dawes, president, in his annual statement to stockholders on 1942 operations.

The company produced 25,040,000 net barrels of crude oil during the year. Its wholly owned Cumberland field in southern Oklahoma underwent "substantial and important expansion" during the year, and the Pauls Valley field in Garvin County, Oklahoma, was a Pure discovery.

As in interference with the war effort, Mr. Dawes deplored the "constant agitation by the Treasury Department" which would eliminate or reduce the depletion allowance before the computation of income taxes, a right which has been in effect for 24 years. "It means in the last analysis," he said, "that it would deny the right to recover discovery value, and to advocate its repeal is to propose virtual confiscation. Although disapproved by substantial legislative majorities, it was a menace hanging over the industry which necessarily decreased the drilling of exploratory wells and deprived it of normal incentives."

Pure is currently installing new facilities costing $12,000,000 to supply required products for war, and during the year increased refinery crude processing volume. In the new construction program, Mr. Dawes pointed out that "the company has had constantly in mind the effort to build facilities in such a way that they will be useful after the emergency is past, both for increased economy of manufacture and improved quality, as well as new uses such as are involved in aviation. The company is processing a number of war products required by the Government."

Construction costs for the refinery additions and new transportation facilities have been paid out of current funds.

Oil's POSTWAR Outlook

(Continued from Page 24)

opments prior to Pearl Harbor. Since then, the situation has been exactly reversed with exports at an all-time high and imports reduced to a mere dribble. The pre-Pearl Harbor trend, however, undoubtedly will be resumed if a shortage of crude oil supplies does develop here.

This would mean greater imports from the Latin-American countries, Venezuela, Colombia and Trinidad, where new reserves have been developed during the past year. The possibilities inherent in this situation make it desirable that our State Department encourage and support American oil companies in their foreign operations.

More Gasoline Possible

If a shortage of crude oil does develop here it does not necessarily mean that there will be a shortage of gasoline likewise. The full significance of wartime developments in the manufacture of gasoline has not been publicly analyzed. One potential result of these developments is an increase in the yield of gasoline from crude oil. Catalytic cracking alone has been said to increase this yield 10 per cent. Other processes bringing previously wasted or unwanted hydrocarbons into the gasoline picture also contribute to greater yields. In July 1941 the yield of gasoline was 44.6 per cent. Some refineries have produced in excess of 70 per cent. Thus, the yield of gasoline could be substantially increased if the necessity arose. There will still be large demand for fuel oil and since this must be met it is improbable that the yield of gasoline will be increased as sharply as potentially possible.

Upward of three score catalytic-cracking units are being or have been installed in the United States. They will have a capacity of possibly 750,000 bbl. per day. Because of the widening scope of the war and the attendant increase in demand for aviation gasoline, it is probable that the number of these units under construction will increase this year. While there is great significance alone in the volume of oil which will be processed in these units, there is additional significance in the fact that progress in technique has been so rapid that original estimates of volume and quality of products are revised upward before units are completed.

Catalytic cracking, particularly of the moving catalyst type, is very young. Of the two processes employing the moving catalyst, one, the "fluid" process was announced only 2 years ago while the other, the "TCC" process was announced only last June, less than 9 months ago. Therefore it is obvious that optimum operating conditions have not yet been determined and that further improvement may be confidently expected.

TABLE 1
Shipment by Water Transport

Route—U. S. to:	Cargo tons per month	Water route, miles (statute)	No. of cargo vessels (C-1)	Fuel, tons required per month	Crew personnel required
Australia	100,000	7,575	54	16,640	3,780
U. K.	100,000	3,610	34	7,930	2,380
Alaska	100,000	1,415	16	3,110	1,120
Suez	100,000	14,100	96	30,950	6,710

Shipment by Air Transport

Route—U. S. to:	Air route miles (statute)	No. of cargo planes (C-46A)	Fuel, tons required per month	Crew personnel required	No. of tankers required to supply fuel	No. ships required to maintain personnel plan
Australia	7,565	6,550	1,012,000	78,500	228	69
U. K.	3,879	1,900	295,500	22,500	52	20
Alaska	1,505	563	105,500	4,150	9	2
Suez	10,016	5,885	837,300	58,370	85	59

Transportation will also assume a somewhat different aspect in postwar years though this change was foreshadowed by developments that preceded our entrance into the war. The fact that the industry had become increasingly transportation conscious in recent years is shown in a review of its expenditure presented in an A.I.M.E. paper by J. E. Pogue and F. G. Coqueron, Chase National Bank. In 1937 8.5 per cent of 30 companies' total expenditures were directed toward transportation. In 1941 this percentage had risen to 18.9 per cent, more than double that of 1937. The most significant change was in expenditures devoted to produce pipe lines which virtually quadrupled and rose from 7.4 per cent of the total allocated to transportation to 15.6 per cent. Developments of the products pipe line should continue until all centers of consuming areas large enough to accommodate the capacity of an economic-size pipe are served.

Big Line Supplants Tankers

The most spectacular transportation development of the war is the construction of the 24-in. pipe line. According to present estimates this line will deliver Texas crude oil to New York at a cost of 13 cents per barrel on the basis of 20-year amortization compared to 16 cents by tanker. This would indicate that the "big inch" line will remain in service as an oil carrier and possibly supplant 20 per cent of the tanker fleet engaged in Gulf-North Atlantic service. However, the possibility of its being duplicated is remote since the economic advantage these figures indicate amounts to only $0.0007 per gallon, a small margin to warrant the investment of $90,000,000. Another limiting factor is the ability to obtain sufficient oil to fill the line for a 20-year period. Thus it is improbable that another big crude line will be undertaken unless new reserves capable of producing upward of 100,000,000 bbl. annually for a quarter of a century are located in a fairly concentrated area.

A less publicized development in the field of transportation is the tanker-construction program. The significance of this program was indicated by J. Lewis Luckenbach, president, American Bureau of Shipping, when he said: "The addition of these tank vessels (61 in 1942) to the United States tanker fleet ranks us with the largest tanker operators in the world and with the consummation of the tanker-building program now in hand we will be the owner of the greatest tankship fleet in the world." These new tankers are larger and faster than their predecessors and will make transportation by sea more economical. Whether this fleet will remain entirely in the possession of the United States after the war is questionable. Norway, prewar possessor of the world's third largest tanker fleet, has lost many vessels of the United Nations and it may be desirable for us to make a number of tankers available to Norway as Great Britain has done to some extent in the past 2 years. Others may be disposed of during the war under lend-lease agreements.

Other changes in the field of transportation or distribution are possible. Increased use of large terminals made possible by the expansion in inland waterways transportation capacity is why. Some companies are envisioning even more pretentious service stations equipped not only to dispense oil products but also to service cars in other respects. Such stations would be more economical from the standpoint of being able to accommodate full tank-wagon shipments thus eliminating a multiplicity of stops.

In summary it might be said that marked changes are in prospect for the oil industry. With its manpower engaged almost exclusively in the prosecution of its war effort, it has had neither the personnel nor the time to engage in the intensive study which this problem deserves. The great importance which is attached to the readjustment period and the substantial readjustment which the industry must undergo before it returns completely to normal peacetime pursuits make it highly desirable that a thorough study as proposed by the PIWC be conducted.

Mud Conditioning in Embar Field

by Harry F. Simons

MUD-CONDITIONING is one of the principal factors in the drilling to the deep Ellenburger pay (approximately 7,900 ft.) in the new Embar pool of Andrews County, Texas. One company has developed a tank which is included in the mud system and which performs a number of tasks.

The tank permits the ready addition of chemicals to the mud and can be used for batch mixing if necessary. However, its main purpose is to separate the shale and cuttings from the drilling mud before the mud enters the regular circulating pits. It is also used as a temporary storage while jetting and cleaning out pits.

The rig with which the tank is used is the regular two-motor compound type with the pump located back of the prime movers. The pits used customarily with such rigs are L-shaped, the flow line from the well entering the pit which is parallel to the drilling equipment. The mud then flows the length of this pit and makes a turn (generally through a boarded ditch) into the second pit and thence to the pump suction. This is the pit system used at Embar.

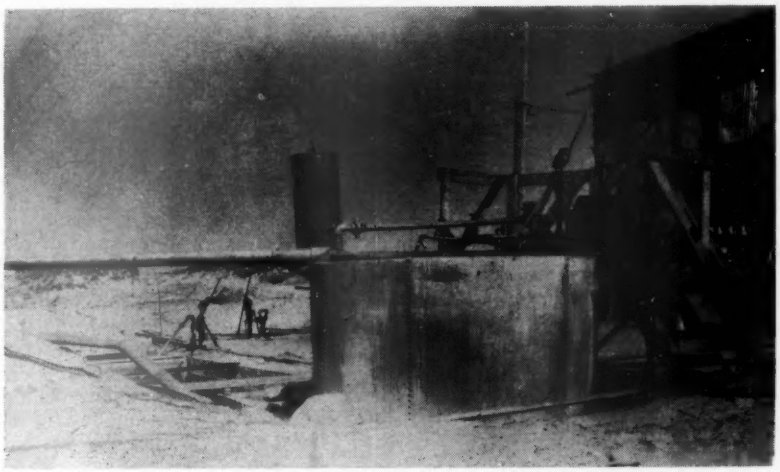
The surface soil at Embar is very sandy, in fact it is almost true desert in the immediate locality. The pits are therefore boarded on the sides and bottom to prevent loss of mud. The pits are each about 45 by 10 by 5 ft. deep (Figs. 1, 2).

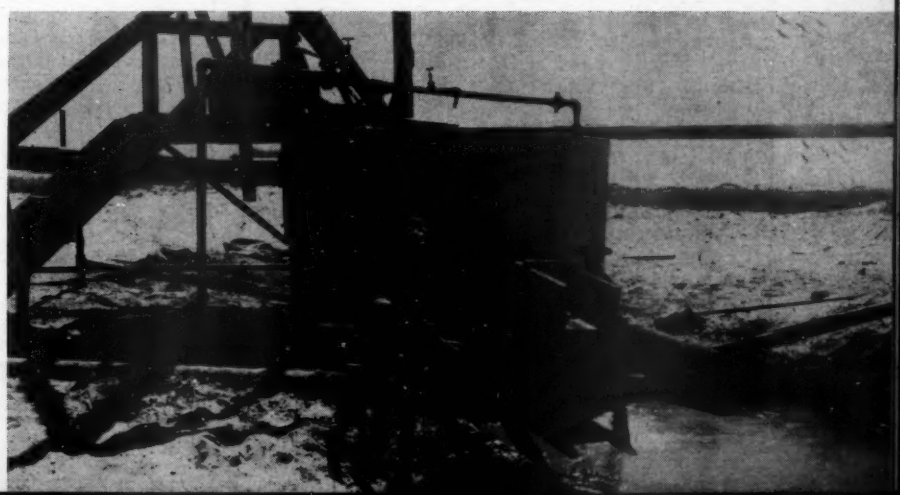
The customary cellar hookup is used with the mud flow line leaving the protective string of casing through a T between two blowout preventors, the lower one blanked so that it serves as a valve and the upper one equipped to fit around the drill pipe. This T also has the necessary connections for filling the well with mud or killing it.

The flow-line valve is 7-in. flange connected and the line between it and the well head T is the same size. After the line leaves the valve it is expanded to 8⅝ by a special flange. The flow line is supported by adjustable pedestals made by putting 2½-in. pipe inside of 3-in. with both pipes having the necessary adjustment holes.

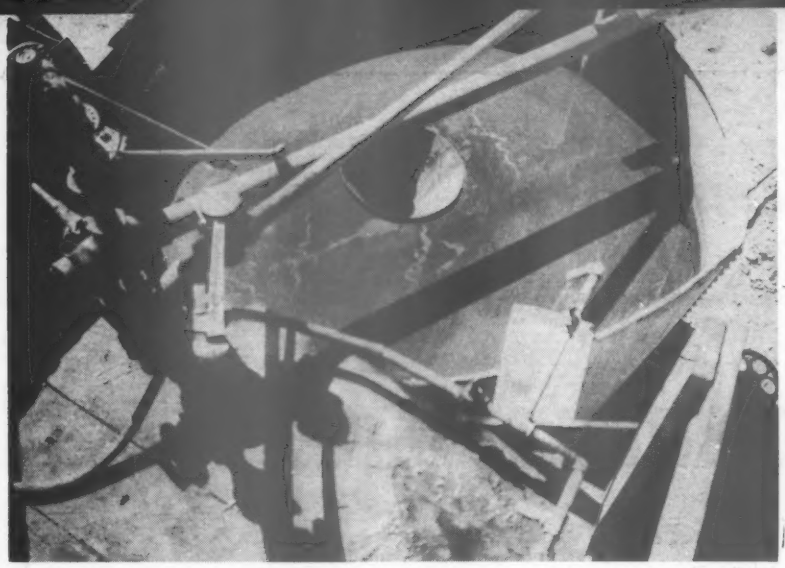
The 8⅝-in. flow line is connected by a Dresser coupling to a nipple welded into the wall of the tank near the top. Just before this connection, a 2-in. line is connected into the bottom of the flow line which permits a small stream to be diverted into a sample box from which well cuttings are obtained.

The tank is the bottom ring of a high 250 bbl. bolted tank set on a board foundation. It is approximately 9 ft., 6 in. in diameter and 5 ft, 5 in. high. The nipple through which the mud enters the tank is welded





Left: Flow line of tank used in mud system on rig in Embar pool, Andrews County, Texas. Lines leading off to left are jets for removing cuttings from tank. Below: Pit side of tank used in circulating system. Normal discharge of mud is through trough while line for draining tank is lower and to right. Sample box is behind gun in center foreground and the drop of the sample line from flow line is partially obscured



Inside of special mud tank used on rig drilling to Ellenburger lime in Embar pool. End of flow line can be seen at upper left, just below end of barrel. Top of discharge funnel is in center. Jet controls, gun and gun controls are at left center. One-inch pipe at lower right is the water line

in tangentially so a swirling motion is set up. It is located so its center is 1 ft. from the tank top.

The outlet from the tank is through a funnel located in the center. This funnel is about 18 in. in diameter to the top and reduces down to 7 in. The top of the funnel is approximately 3 in. below the bottom of the flow line entering the tank. The mud coming into the tank sets up a slow circular motion with the quietest portion being that toward the center and, consequently, most of the cuttings settle out and virtually clean mud passes out through the funnel.

The tank is also equipped with two fluid-operated jets located on opposite sides from each other. These jets are connected to lines leading to the reserve pit into which the shale is ejected. A platform on the derrick side of the tank is equipped with a mud gun, the necessary connections and valves for operating the jets and the gun, a fresh water line and a barrel for mixing chemicals. This barrel lies on its side with a portion of the upper-most side removed. A valve at the lower end allows regulation of chemical flow into the mud.

The exit from the tank is about 2 ft. above the bottom and is a 7-in. nipple about 18 in. long which enters into a wooden trough about 5 ft. long. Also there is 7-in. outlet at the bottom of the tank equipped with a valve which may be opened to empty the tank of fluid completely.

When it comes time to jet the shale from the tank, this drain valve is opened and the drilling mud drained out into the first circulating pit. When almost all of the mud has been drained off, the shale is jetted out and the tank washed with the mud from the guns. If the circulating pits are also to be cleaned, the tank is then filled completely with clean mud. Complete filling of the tank is accomplished by placing a bag filled with fibrous material in the mouth of the funnel.

The first circulating pit is about 10 ft. long and 10 ft. wide. Particular care was taken to get the top board in the partitions between the pit sections level so that the mud flows over in a thin, even stream. The second pit section is about 35 ft. long. The mud then passes through the boarded ditch into transverse pit, the first section of which is about 30 ft. in length and the second section, where the pump suction is located, is about 15 ft. long. Each of the pit sections is equipped with a jet and a mud gun so that it may be cleaned or the mud in it may be agitated. The guns and jets in the pits, the gun and jets in the tank and the hopper-type mixer are all tied into one common 2-in. line.

The jet-type mixer is located at the end of the suction pit and the building housing the admixtures is located close by. The bentonite to be added is run through this mixer into the suction pit where it is picked up and pumped into the well. Generally the chemicals are added as the mud comes from the well, but if it is desired the mud may be transferred to the tank where the necessary chemicals can be admitted.

A fresh water-Aquagel type mud is used, the viscosity, water loss and filter cake being controlled by the addition of caustic quebracho. The objective is to have a mud with a water loss of approximately 10 cc. (filter press at 100 lb. per sq. in. for 30 min.) and a cake of 2/32 in. Viscosity of the mud generally runs around 32-34 sec. A.P.I. and the weight from 9 to 9.5 lb. per gal. This fresh water mud is possible because all of the troublesome salt section is cased off by an intermediate string of casing which is set through the salt section in the pool.

To maintain the desired mud it has been found necessary to add from 10 to 12 sacks of Aquagel daily along with the fresh water and approxmately 200 lb. of quebracho and 40 lb. of caustic soda.

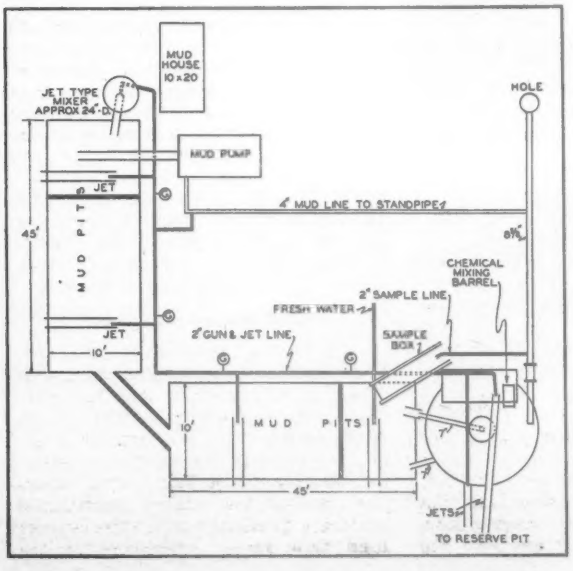
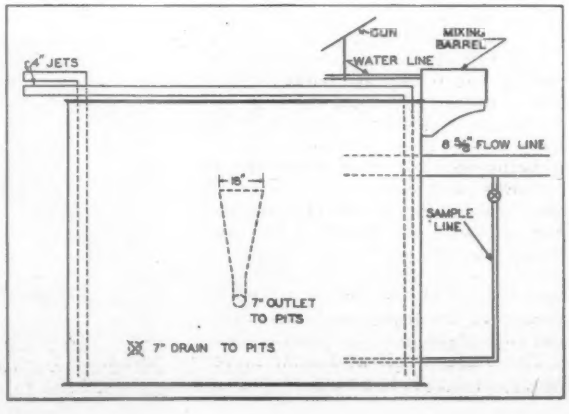
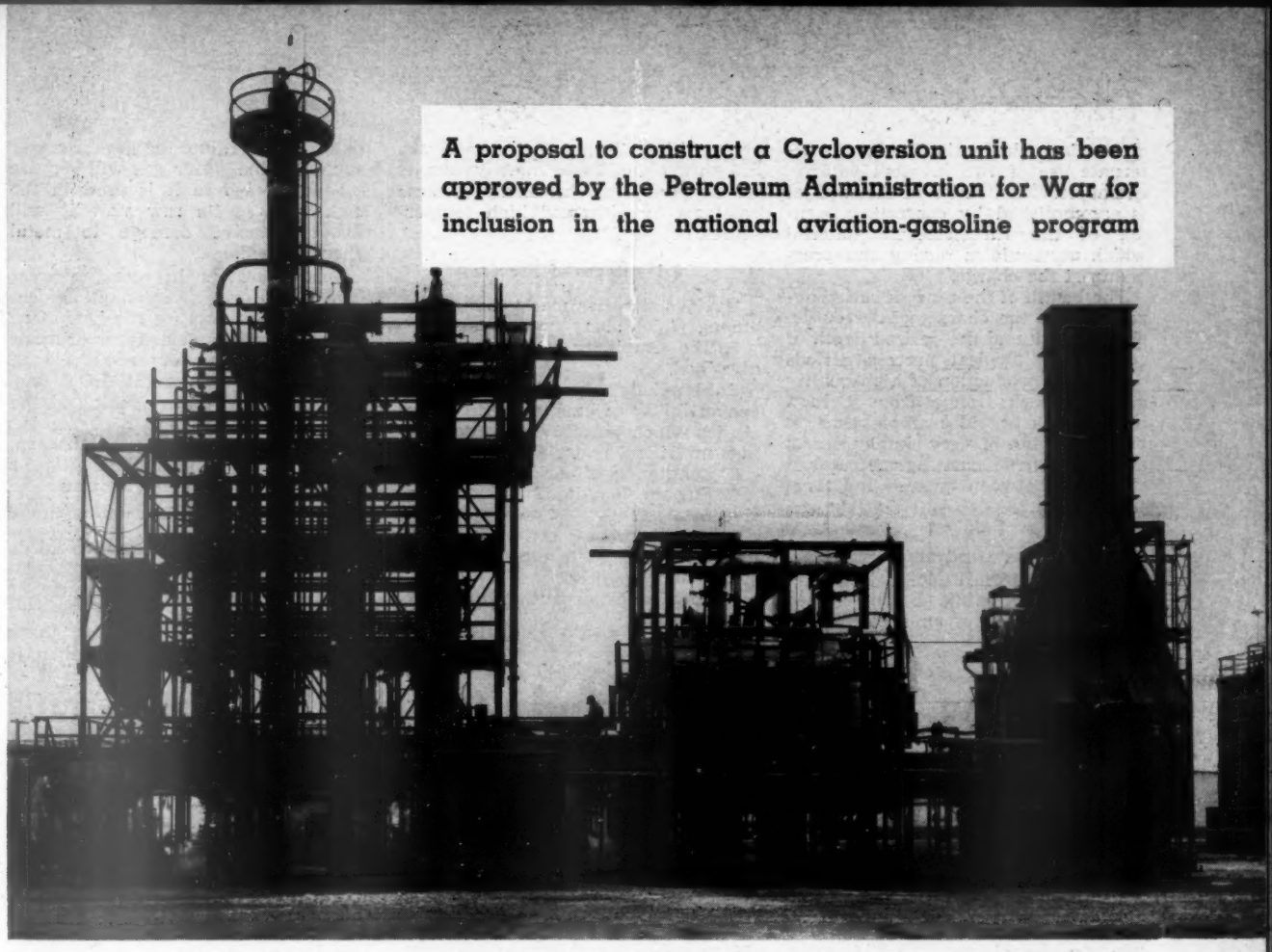


Fig. 1 (left) mud system and Fig. 2 (below) elevation of mixing tank used at Embar



A proposal to construct a Cycloversion unit has been approved by the Petroleum Administration for War for inclusion in the national aviation-gasoline program



General view of Phillips catalytic unit where "Cycloversion" was developed. Catalyst chambers are between towers and heater

Phillips' Cycloversion Process

CYCLOVERSION is a process developed and recently announced by Phillips Petroleum Co. for the manufacture of high-quality aviation-fuel ingredients. Naphthas produced in thermal operations are converted catalytically to aromatic-rich stocks for use in aviation gasoline.

The necessity for maximum development of catalytic conversion processes at this time is obvious. Better fuels make possible the development of better engines. The extension of fighting fronts to all parts of the globe is demanding from the industry enormously increased quantities of aviation fuel. The Cycloversion process helps on both counts—for it not only aids in meeting the increased quantity demand but also can provide aviation fuel much superior to present-day 100-octane.

Development

After years of laboratory and pilot-plant investigations, the company installed, at one of its refineries, a new unit incorporating the many unique design features of Cycloversion. Operation of this unit has verified the results of the earlier and continued small-scale experimentation. It has also furnished the necessary engineering information for large Cycloversion units which embody many new features of design and operation.

An outstanding feature of the process is the extensive production of aromatic hydrocarbons in the gasoline boiling range, resulting from Cycloversion of a selected gasoline or naphtha-type charging stock. The extent of cyclization is demonstrated by the fact that aviation gasoline fractions may be obtained containing up to 90 per cent of aromatics with very small amounts of olefinic unsaturates. The principal byproducts include butylene and isobutane which are valuable as alkylating agents. Conversion is accomplished with high process efficiency.

In the course of studying process variables, the Cycloversion unit has been operated on stocks ranging from light gasolines to heavy gas oils. For aviation-stock preparation, excellent results have been obtained by processing selected naphthas derived from gas oil or topped crude thermal cracking or from gas reversion operations. Maximum yields of high-quality gasoline are obtained, along with valuable gaseous byproducts and minimum dry gas and carbon. These results are accomplished by adjustment of the conversion conditions (temperature, pressure, concentration, contact time and cycle length) to suit the quality of the charge whose characteristics will vary with source, boiling range and previous treatment.

Description of Process

Cycloversion involves passing the feed through a conventional heater where it is vaporized and raised to conversion temperature. The design of the furnace and the method of operation provide for control of thermal decomposition. The heated vapors pass through the catalyst chamber at moderate pressures and at relatively high flow rates. Processing of the

charge is made continuous by the alternate use of two or more catalyst chambers. Reactivation of the catalyst is accomplished by controlled burning of the carbonaceous material which accumulates during the processing of the charge.

The length of the process period depends upon the characteristics of the charge stock and the desired depth of conversion. Typical process periods during the production of high-quality aviation stocks range from 1 to 5 hours. This provides ample time to permit the use of very simple control equipment in alternating the catalyst chambers between process and reactivation.

Catalyst

Cycloversion catalysts are characterized by long service life, and resistance to poisoning. Steam is used in both the process and reactivation steps without injury to the catalysts. Simplified and rapid reactivation is made possible by the ability of these catalysts to withstand high temperatures.

Advantages of Process

Cycloversion has many advantages, among which are:

1. The simplicity of the fixed catalyst bed.
2. Simplicity of design and ready convertibility of existing refinery facilities which permit substantial savings of critical materials.
3. Long process periods.
4. Rugged, long-lived and inexpensive catalysts.
5. Precise process control.
6. Flexibility with respect to charge stocks and products.
7. Low investment and operating costs.

Gas From Upper Sand Used While Drilling Well

IN some parts of the country wells being drilled to deeper formations penetrate upper pay zones which contain considerable gas. This is particularly true of the Permian basin where the Yates sand and the dolomite immediately below it frequently give a little trouble because of the gas in the formation. These gas-bearing formations often carry a rather high pressure but the volume is so small that they cannot be developed for commercial purposes. However, the volume is sufficient to supply fuel for the internal combustion engines used on the drilling rigs.

Use of this gas depends on running an intermediate string of casing and the saving obtained through the elimination of a fuel bill would not be sufficient to return this cost of $15 to $25 per day for liquid fuel. However, in many cases it is necessary to run the intermediate string for other reasons and consequently only equipment needed to get the gas out of the formation and cleaning it can be charged to the fuel costs.

The accompanying diagram shows the method employed for using the gas in an upper formation. In this case the gas zone is at approximately 2,800 ft. and it is necessary to run an intermediate string at about 4,500 ft. After the intermediate string has been run, it is cemented so that the annular space is filled to just below the gas-bearing horizon. The usual packoff type head is used between the surface casing and the intermediate string of pipe and one of the openings in the casing head is connected to a separator.

The gas is then free to bubble up through the mud, through the 2-in. opening in the braden head and thence into the separator. If any mud is carried with the gas, it can drop out at this point. The annulus is gradually emptied of mud and after the system has been in operation for sometime, the amount of mud deposited in the separator will be very small.

If sweet gas is being produced from the formation, it can be taken from the separator and run through a regulator and then into the gas-air mixer on the engine. Sour gas will require sweetening before it is used in the engines as in its raw state it will cause extensive damage to metal when burned.

Most operators in sour-gas areas have their own sweetening devices for using lease gas for fuel, etc. One of the most common types consists of a pair of chambers about 6½ ft. high and made from 12¼-in. casing. Each chamber has an opening at the bottom for the admission of the gas and a pair of openings at the top. One of the openings at the top is for the gas to leave the chamber and the other is to bleed the pressure off the chamber.

One chamber is about two-thirds full of a caustic soda solution and the other contains the same amount of light motor oil. The gas first enters at the caustic soda chamber where the sulfide is removed and then it enters the oil chamber where it is stripped of water. No instruments are used to determine the sweetness of the gas being used in the engines but the drilling crew's smelling of the engine exhaust tells them when caustic soda chamber needs recharging.

Another sweetening arrangement is the bubbling of the gas through a slaked lime solution followed by stripping through oil.

After the well has been completed, gas from the cased-off formation can still be used for the remainder of the drilling program in the field. This is particularly desirable and saves considerable money where the gas from the pay being exploited is sour and requires treating.

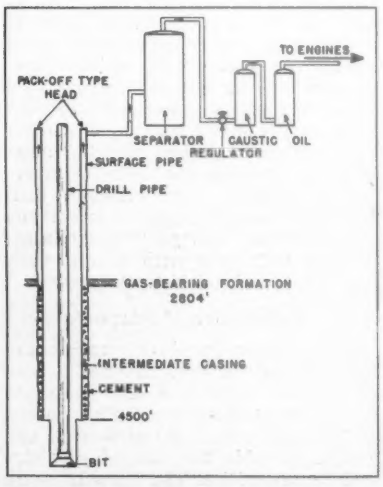


Fig. 1—Schematic diagram of system for using gas from formation cased off by intermediate string of pipe

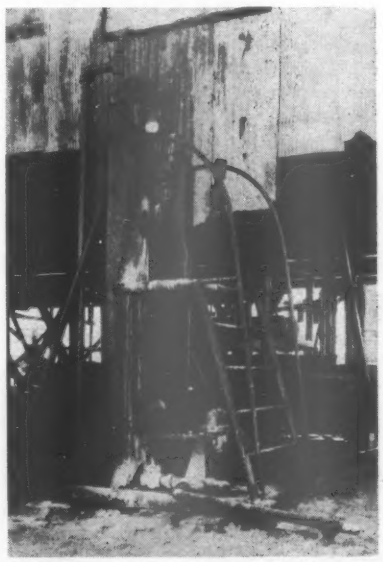


Fig. 2—Chambers for sweetening sour gas used on drilling rig. Front chamber contains solution of caustic soda and right-hand chamber contains light lubricating oil. Regulator is on line admitting gas to caustic soda chamber

Pump-Station Practices Of Crude-Oil Pipe Lines

by Paul Reed

Here are described a variety of methods for meeting problems of piping, relief valves, heaters and coolers, maintenance facilities and equipment for combating sabotage at trunk-line stations.

SOLUTIONS of certain problems arising at one pump station sometimes lead to changes in standard practices at other stations of the system as well as in the procedures of other pipe-line companies. A number of methods are discussed in this article which have been observed at the stations of major crude-oil trunk lines. These have been developed in connection with the installation of equipment, operation, maintenance and safety measures.

A variety of practices in regard to design of suction and discharge lines and station manifolds have been observed in recent years. Although in some areas a number of companies favor the placing of much of the station piping aboveground, this cannot be regarded to be general practice as yet. The advantages of accessibility and avoidance of subsoil corrosion are said to justify installations of this type. Improvement in safety conditions has resulted from provision for ample ventilation of manifold pits where they are sheltered by a shed with open sides.

New types of relief valves are being tested on pipe-line systems. Several of these operate on the differential piston type principle. One of these uses a bourdon tube which functions through a system of levers and springs to release upper piston pressure so as to allow the valves to discharge when pressure exceeds a predetermined amount. Provision is made for allowing the valve to reset itself automatically at half the normal working pressure.

In order to place heat exchangers so that they are accessible even though they are installed on buried lines, a crude-oil pump station of one company in Texas has placed them in open concrete pits. Each cooler has a separate pit. Adjacent to each pit, there are surge bottles for reducing pulsations of the pumps. When it is necessary to work on the heat exchangers they can be raised from the pit and placed on skids on top of the pit walls. In this way an excellent work bench is provided for repairing the heat exchangers. (Fig. 1.)

With the difficulty in obtaining tube turns, due to war conditions, some companies are going back to the practice of using mitered cuts for fabricating bends in piping at stations.

At some stations, screw fittings are used on all lines for a distance of 100 ft. from the station building. If occasions arise when it is absolutely necessary to fabricate piping by welding closer to the station than this, the station must be shut down.

For efficient operation and maintenance functions carried on within the station itself, close attention is being given to the manner in which space is utilized and facilities are provided for effecting adjustments, replacements and repairs.

Some of the larger stations have shops with a lathe for light work,

Fig. 1 (Left) Cooler for engine-jacket water installed on buried discharge lines. Adjacent to each pit are surge bottles for reducing pulsations of the engines. In background can be seen open-sided shed covering manifold pit. Fig. 2 (Right) Four inlet valves for a diesel engine are supported by a special rack for storing them conveniently in the pump-station engine room

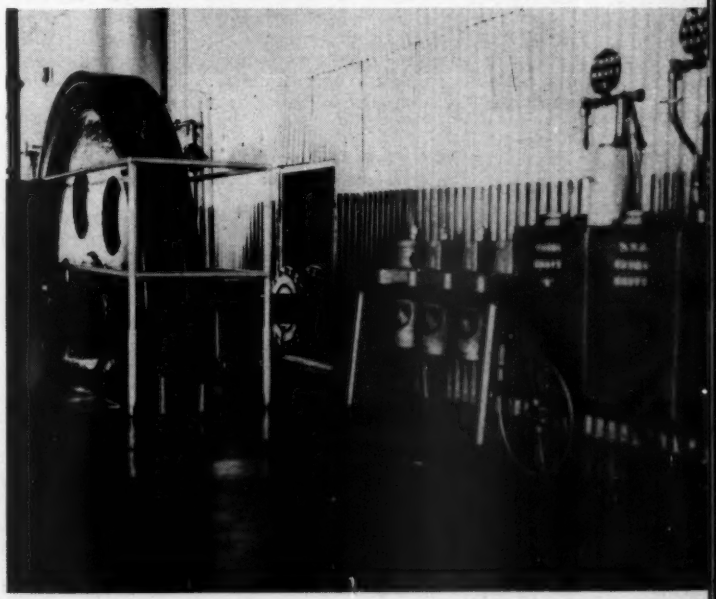


Fig. 3—Work bench utilized in station maintenance has been built on space available for reinstallation of an engine, without disturbing engine bolts

equipment for pouring bearings and for metallizing. In repairing centrifugal pumps sleeves are built up by metallizing, turned down on the lathe and shrunk on the old impeller. Certain major companies have found it advantageous to maintain complete machine shop and welding shops at central points for serving the entire system of the company.

A portable tool box for use within the station has proved to be satisfactory for the staff of one company. The tool box itself is mounted on two air chambers, at the bottom of which small rollers are attached so that it can be easily pushed from one part of the station to another.

Ever since centrifuging of diesel engine lubricating oil was introduced into pump station routine, the problem of cleaning disks of the centrifuge bowl has been annoying. So much time is consumed in this operation that centrifuging would have been discarded long ago if it were not for the fact that removal of abrasive material from the oil by this process has proved to be beneficial. At some pipeline stations in Texas operations for servicing the centrifuge have been improved by placing the bowl and disks on a table specially designed for the purpose. For the cleaning of each individual disk a roll of 3-in. wide wrapping paper is supplied.

Because of the advantage in keeping equipment off the floors of pump stations, some organizations have found it worth while to provide special racks for heavy equipment which should be readily available for replacement such as inlet valves for diesel engines and large gate valves. Lubricating-oil containers are mounted on wheels. In addition to making such equipment more accessible these measures make it possible to avoid having dirt accumulate at points on the station floor which otherwise would be difficult to clean. (Fig. 2.)

Maintenance Facilities

At stations where some of the pumping units have been removed due to changing transportation conditions, ways have been devised for utilizing the space over the empty engine foundations.

In the foundation of an East Texas pipe-line station, the bolts protrude now that the diesel engine has been removed. These bolts were allowed to remain in place so that they would be ready in case the unit were reinstalled at a future time. A wooden platform was placed over the bolts of two of these foundations, on which tool boards were installed with sloping sides. The space between the boards is used to store brooms, waxing mops and other equipment with long handles. In addition to increasing safety conditions such a tool board has an advantage in being located near the center of the engine room where tools and implements are needed. (Fig. 3.)

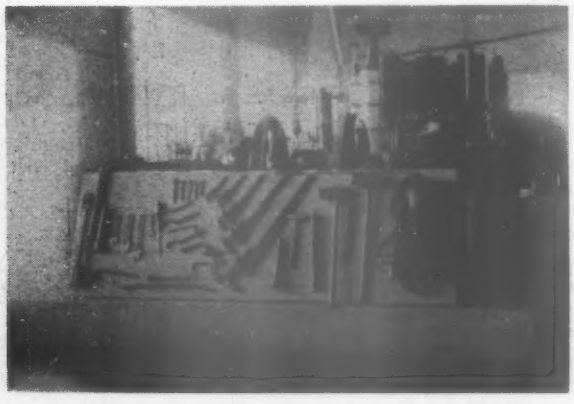
A third empty engine foundation at this same station was utilized in a different manner. Without disturbing or damaging the foundation bolts a broad work bench has been built. Because of its unusually large size and the convenient place in the engine room where it is located, this bench has proved to be a distinct addition to the station. The top of the bench has been made of wood, part of which is covered with a steel plate which is not damaged when large engine and pump parts are placed on it. (Fig. 4.)

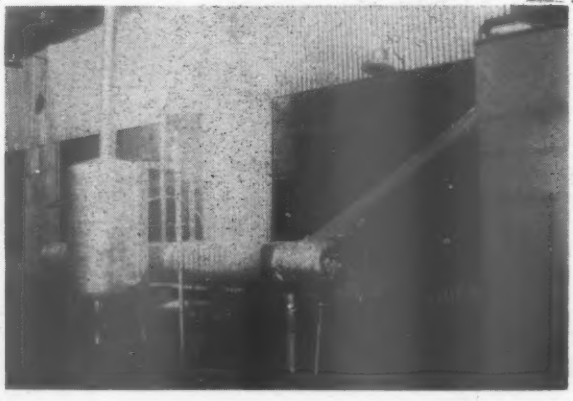
Exhaust Heaters

For utilizing exhaust heat of diesel engines for warming the interior of a station building in winter, several different types of equipment are used. In most cases these function by raising the temperature of water circulating through an exhaust heater or boiler. Such heating equipment is placed outside the station building and is thoroughly insulated. (Fig. 5.) To heat a large station as many as four of these exhaust heaters may be used. A common practice is to have the water level in the boiler maintained by automatic control; temperature is controlled manually. One station which has used vertical heaters is having these replaced with a horizontal type. Experience has shown that exhaust heaters function more satisfactorily with water cir-

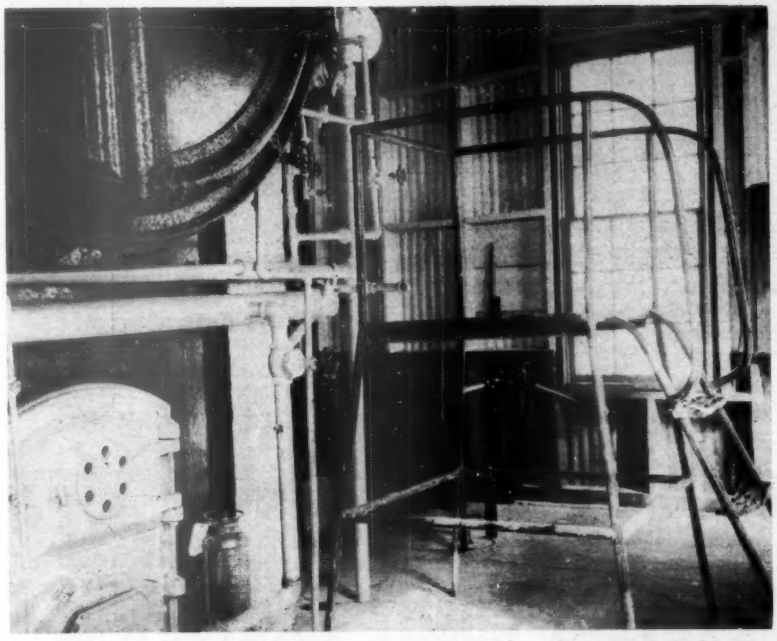
(Continued on Page 52)

Fig. 4—(Left) Tool boards built over 8-in. foundation bolts where diesel engine has been removed from a station.
Fig. 5—(Right) Boiler for utilizing exhaust heat of diesel engines for heating the interior of the station building





PLANT PRACTICES



Home-Made Paint Sprayer for Refinery

TO facilitate scattered small paint jobs, a large Kansas refinery uses a paint sprayer mounted on a two-wheeled cart that can be pulled by hand to any part of the plant. The unit was assembled by welders and machinists in the plant. The cart was built with an axle and two wheels from an old automobile. It carries a pressure vessel for the paint with a hose extension for the sprayer. The reel for the hose was fabricated from old rod material. Also provided is a small metal box for accessories and tools. The paint vessel was bought.

Work Stand for Boiler Operator

THE practice of using a stepladder for working around a boiler not only is sometimes inconvenient but also dangerous. To avoid this, the operator in a boiler plant of an Oklahoma gasoline plant has provided a portable work platform. It is fabricated from small piping, as shown in the picture. The platform size is such that the operator has room to move about, and is at a height to enable him to reach the highest part of the boiler without effort. A guard rail is provided to prevent a misstep.

Safety Lock for Valve on Blowdown Line

THE steam blowdown lines on the boilers in a large Oklahoma gasoline plant have been equipped with valves, in addition to the regular gate valves, that can be locked in a closed position while workmen are on the inside of a boiler when the boiler is shut down for cleaning or repairs. This is a safety precaution to prevent steam flashing back into the boiler should the main gate valve be opened accidentally at a time when another boiler on the line is being blown down. The locking device consists of an arm extension on the valve control. This swings over the valve and is secured with a padlock to a metal eye-stob embedded in the concrete floor.

Proper routine maintenance will keep this drilling rig making hole

More than ever before, it is essential today that all types of equipment be maintained in good condition. This article discusses simple basic maintenance for both alternating and direct-current electrical equipment, in order that it may be kept running without shutdown.

by E. H. Lamberger*

Simple Maintenance of Electrical Equipment May Prevent Costly Shutdowns

TODAY electrical apparatus is called upon to perform greater tasks for longer hours. Proper maintenance of equipment will minimize the possibility for untimely shutdown, assure normal functioning of equipment and lengthen the life of apparatus.

The very conditions under which drilling and pumping equipment must be handled and operated make good maintenance more difficult, but none the less essential. Observance of the suggestions given below of simple basic maintenance for both a.c. and d.c. equipment will go far toward achieving these results for electrical equipment in oil production.

Precaution

Do not work on hot equipment except in emergencies. When necessary to do so, use dry and non-metallic under-footing and have at least one other person on hand. Do not eliminate or defeat safety devices.

Care of Motors and Generators

(a) Keep motors clean externally and dry internally. Particularly oil, metallic dust and carbon dust must be kept from accumulating on any part of the winding, current collector, or commutator.

(b) The exterior of motors should be kept clean with an air hose and by wiping with a rag, as accumulation of oil and dust on the exterior of open type motors, makes it more easily possible for dirt to get into the machines, and, in extreme cases, materially affects the heat radiation from the machines. Be sure the accumulation of water in the air hose is blown out before the air blast is turned onto or into the motor.

(c) On the interior of motors, dirt reduces heat radiation and movement of ventilating air.

Oil on windings or commutators deteriorates insulation, resulting ultimately in grounding, short circuits, and burnouts.

(d) The interior of motors, if accessible, can be kept clean by wiping or with an air hose. The air passages through stator or rotor should be thoroughly cleaned with the air hose. Air pressure should not exceed 50 lb. per sq. in. as higher pressures may lift insulation wrappings and blow dust into the coil insulation. Accessible coil surfaces and creepage spaces should always be thoroughly wiped with a rag following cleaning with an air hose.

(e) When oil and dirt have accumulated on windings, so they cannot be completely removed by air hose and wiping, they must be removed by solvents. Satisfactory solvents are Stoddard solvent (a cleaner's naphtha) and carbon tetrachloride. Either must be used with caution, as the former may cause an explosive atmosphere, and the vapor of the latter is injurious when inhaled in any appreciable quantity.

(f) A coat of insulating varnish applied to windings and creepage spaces will preserve the insulation of these parts. Such a varnish application is particularly desirable after insulation has been cleaned with a solvent.

(g) Splashproof and totally enclosed motors need little routine attention except to keep the external surface clean, and air intakes, air outlets and air passages unobstructed and clean.

Current Collectors and Commutators

(a) The current collectors of generators and wound rotor motors, and the commutators of direct-current machines must have careful attention.

(b) Brushes should never be permitted to get so short that the brush spring bears on the brush box, preventing full brush pressure on the collector ring.

(c) Brush pressures should be uniform on all brushes of a machine and should amount to from 2½ to 3 lb. per sq. in. of brush surface for a collector ring, and from 2 to 2½ lb. for a commutator.

(d) Brushes should be kept free in the brush box—so they can move up and down to maintain contact at all times.

*Petroleum Engineer, Westinghouse Electric & Manufacturing Co., E. Pittsburgh, Pa.

(e) Only brushes of the grade recommended by the manufacturer should be used. When new brushes are installed they must be carefully fitted by being "sanded" to the proper curvature while in position. Contact should be made over the entire surface of the brush end.

(f) The ideal appearance of a commutator or bronze collector ring surface is a polished dark brown or chocolate color. Such a surface needs no attention other than to be kept clean. Slight grooving of a collector ring is not objectionable if the surface color is good.

(g) Never use oil, grease, or vaseline as they gum up the brushes, commutators and rings, collect dirt and cause shorting or breakdown to ground.

(h) Should the collector rings or commutator become blackened and rough due to sparking or flashing, they should be smoothed with a hand stone and then polished with sandpaper. Never use emery cloth. Clean thoroughly after stoning or sanding. If the burning is severe, they should be ground or turned, and the commutator undercut.

(i) The external surface of an enclosed collector must be kept clean to permit a full measure of radiation. If housing is fan cooled, the air passages should be kept unobstructed and free of dirt by use of an air hose.

(j) The collector housing should be removed each 4 to 6 months, and carbon dust blown and wiped from all interior parts and surfaces.

Care of Bearings

Bearings should be inspected to assure proper and adequate lubrication each time a machine is started up on a new location and periodically thereafter. With sleeve bearings, the following points should be checked:

(a) The oil ring should revolve freely and carry oil to the top of the bearing.

(b) The oil reservoir should be filled to show in the gage glass, filler cup or at the overflow plug.

(c) The oil, should be clean, of high quality, and of proper viscosity—180 to 220 sec. Saybolt at 100° F. (S.A.E. 10 satisfactory).

(d) Normally, sealed-sleeve bearings require little attention except to maintain proper oil level.

When ball or roller bearings are used, the following points should be checked:

(a) While ball or roller bearing must be adequately lubricated, they must not be jammed with grease, as overlubrication can cause excessive temperature and possible bearing failure. With bearings not designed to prevent excessive grease pressure, by having a passage from the bearing chamber to the exterior of the bearing housing, special care must be taken when greasing.

(b) Only the best quality of lubricant of a grade recommended by the manufacturer of the machine should be used.

(c) Use only clean grease, entirely free of any gritty material.

All mechanical parts of a machine, affecting alignment or fit should be kept tightly bolted. Some of the more important items to be periodically checked would include brushholders, pole bolts, couplings, pedestal bearing mounting bolts, bearing bracket and bearing housing bolts.

Many motors and generators are of dripproof construction. If subjected to dripping water, top covers must be kept in place, and drain holes should be kept open.

Care of Control Equipment

While collectively a control equipment may seem complicated, individual pieces of apparatus comprising it are quite simple and the observance of only a few simple maintenance rules in connection with each is necessary to provide trouble-free operation.

Broadly speaking, control equipment may be classified into three divisions, namely, wiring, contactors, and controllers.

1. **Wiring.**—(Includes cables and resistors).

(a) All cables should be shielded from mechanical injury, water soaking and oil spray, and mounted so they will not be damaged by vibration. If strung along the ground, they should be run in wooden troughs.

(b) Cables should not be run over resistor banks, exhaust pipes, steam lines or in any other location where the insulation will be subjected to excessive temperature.

(c) Cable connections should always be kept tight.

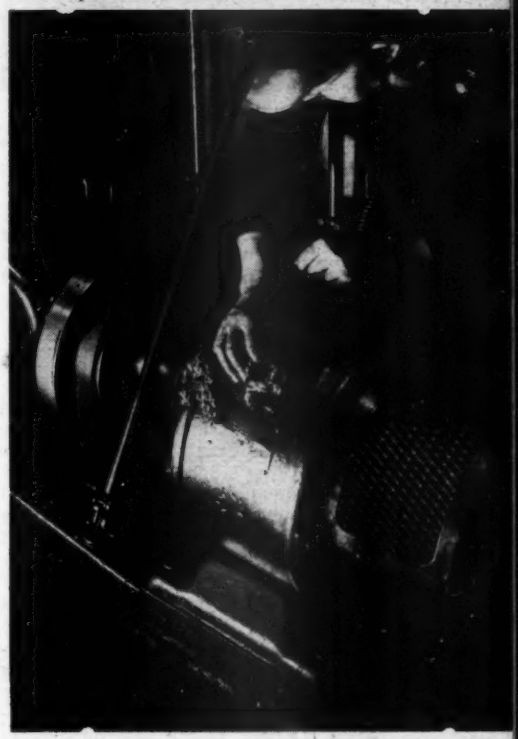
(d) Keep resistors clean for good heat radiation and air circulation, and keep assemblies and terminals tight.

(e) Keep resistor covers in place for safety and mechanical protection.

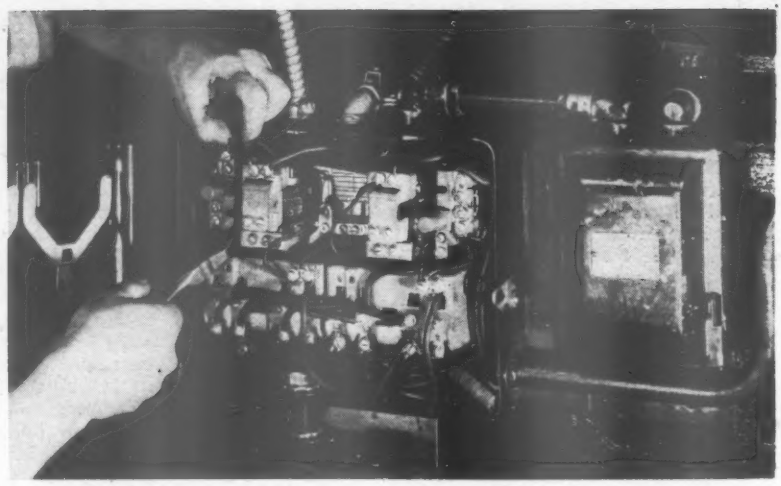
2. **Contactors.**—(Including relays and knife switches).

(a) Keep all parts free from dust, oil and water. Such accumulations may result in breakdown at creepage points. Clean with air hose and by wiping.

(b) With **power off** check contactors



Top: Smooth operation and long motor life result when motors are properly oiled. Care should be taken to avoid using too much oil, lest it contaminate motor winding and commutator. Middle: Periodic cleaning prevents dust and dirt getting into motor windings. Bottom: A thorough motor-maintenance program does not neglect brushes. Proper method of cleaning and surfacing is to press brush down on a strip of sandpaper placed between brush and commutator. Several passes should be sufficient, depending on the brush condition. When pulling, the sandpaper should be held flat against the commutator surface to prevent rounding of brush end



Above: Regular inspection of motor line starters reduces time outages. Left: With proper lubrication, bearing will give years of severe and continuous service without replacement. Bearing wear of less than 15/10,000 in. is measured after 11 years of service. With continued adequate lubrication bearing will last 90 years longer

and relays for free mechanical operation, and see that armature hinge pins are in place and properly secured.

(c) Arc shields should always be kept in place so the arc is broken in the field of the blowout coil. Arc shields should be replaced before the moulded material is burned sufficiently to expose the pole pieces.

(d) Contacts normally wear to give the best contact surface without any attention. They should be renewed when worn so much that adequate pressure is not maintained. Any beads of metal that might form on the contact surfaces should be removed, and the contacts should be replaced if the surface becomes so severely burned that the area of contact surface is materially reduced.

(e) Contact pressure may be checked by placing a thin piece of paper between the contacts, closing the contactor mechanically and measuring the pull necessary just to release the paper by means of a hook spring balance attached to the moving contact screw. If pressure is too low with new contact tips, a new spring is required. Proper pressure can be determined by comparison with that of other identical contactors, if several are used, or by reference to information supplied by the manufacturer.

(f) Failure of a contactor to close may be due to one of the following causes:

1. Lead wires to operating coil may be loose or open circuited.
2. Mechanical interference or excessive friction.
3. Voltage below normal or power off.
4. Operations coil may have an open circuit.

Failure of the contactor to open may be due to:

1. Mechanical interference or friction.
2. Welded contacts.
3. Broken spring.

(g) To minimize or avoid humming of a.c. contactors it is imperative that the surfaces of the moving and stationary armatures be in the best possible condition. Excessive humming may be due to one of the following causes:

1. The sealing surfaces of the magnet may be corroded or dirty, preventing a perfect seal.
2. The mechanical parts of the magnetic surface may be distored so the moving armature cannot find a square seat.
3. The voltage may be too low.
4. The pressure of the contact spring may be excessive.
5. The shading coil (short circuited winding around portion of pole face) may be broken.

(h) If contactors are oil immersed, the proper oil level must be maintained in the case, the oil kept clean and free of moisture. The sludge occasionally should be removed from the bottom of the case, and the oil filtered or renewed.

(i) The blades of knife switches should make full surfaced and snug contact with the jaws. The switch pivot should also be kept snug. A knife switch should not be opened or closed under load. They should be closed quickly and completely.

(j) All mounting bolts and electrical connections to all control apparatus should be kept secure.

(k) The doors of weatherproof controls should be kept securely closed.

3. **Controllers.**—(Including pushbuttons and entrance switches).

(a) Keep terminal and finger boards of controllers free of dust with an air hose, to avoid electrical breakdown between fingers or to ground.

(b) Keep fingers free of beads to assure low-resistance contact.

(c) Fingers should drop from $\frac{1}{16}$ to $\frac{1}{8}$ in. at the end of a segment in order to have adequate contact pressure. Fingers should be replaced if worn so much that the minimum drop does not exist.

(d) Do not lubricate drum segments as this causes accumulation of dust and gritty material.

(e) Keep arc barriers in place and in good condition.

(f) Keep oil-immersed controllers filled with oil to proper level. The sludge which will gradually accumulate at the bottom of the tank should be removed occasionally, the oil filtered or new oil supplied.

(g) Pushbutton contacts should be kept clean and connections tight. Air break explosionproof pushbuttons should be kept securely bolted, and oil-immersed type should be kept filled with oil.

(h) Entrance switches should be kept clean externally and internally. The knife switch jaws should make snug contact with the switch blade and the blade pivot should be kept snug. Fuse clips or jaws should hold the fuse securely. Knife blades and fuses should always make full contact with their jaws or clips.

Care of Transformers

(a) Transformers being connected to the high line as well as the local low-voltage distribution line must always be approached with caution. The workman should never take for granted that the transformer is dead —but should himself make certain that the disconnecting switches are open. Be sure the ground wire is secured to the case and is properly grounded.

The transformer requires practically no routine maintenance. The exterior surface and the insulators should be kept reasonably clean, and any oil leaks eliminated. The tank should not be opened unless there is indication of trouble, such as unusual noise, high or low oil level, ruptures of relief diaphragm, or excessive temperatures at normal loads. The oil should be checked periodically to detect and eliminate moisture or sludge.

Calibration of Horizontal Cylindrical Tanks

by Herndon David

Here is a simple method of determining the volume of horizontal cylindrical tanks which involves less calculation than any other method, and which can also be used to calibrate gage poles for individual tanks. The chart is accurate to within a fraction of 1 per cent.

USE of horizontal cylindrical tanks is common to almost every branch of the oil industry. Their calibration is often a problem which confronts the petroleum engineer in the oil field or refinery, and is one which has baffled many engineers and operators. However, the volume of liquid in such a tank may be determined rapidly as follows:

1. Measure the depth of the liquid in the tank in inches and divide by the internal diameter of the tank.

2. On Fig. 1, follow the line having the value of this ratio vertically to the curve and determine the value of the horizontal line at the intersection, remembering to read the left-hand values if the ratio is less than 0.5 and the right-hand values if the ratio is greater than 0.5.

3. Multiply the volume coefficient obtained in (2) by the length of the tank and the square of half of the internal diameter (radius). The result is the volume of the liquid in the tank in gallons.

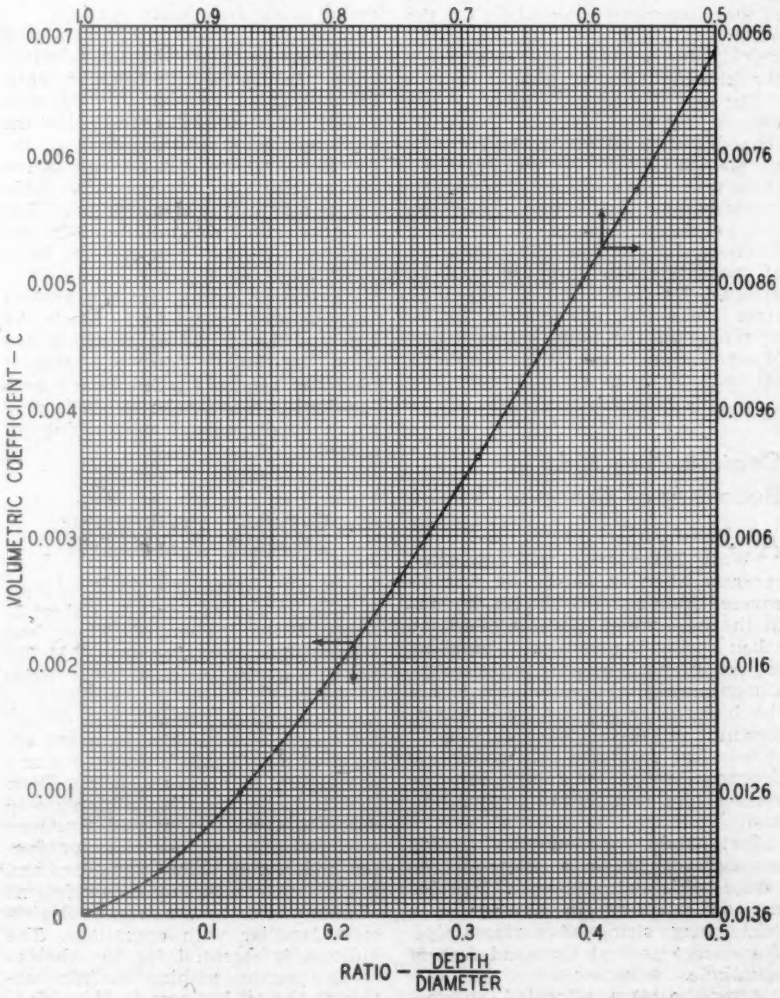


Fig. 1

Example

PROBLEM: It is desired to determine the volume of oil in a horizontal cylindrical tank 96 in. in diameter and 100 in. long when it is filled with oil to a depth of 24 in.

In this case, the ratio of depth of oil to diameter of tank is 24/96, or 0.25. From the graph of Fig. 1, the constant corresponding to this ratio is found to be 0.00266. Multiplying this constant by the length of the tank and the square of the radius as suggested in step (3) above, the volume of oil in the tank is $V = (48)^2 \times 0.00266 \times 100 = 612.8$ gal.

In calibrating gage poles to read directly in gallons it is necessary only to assume an increment of depth, for example 6 in., and calculate the volume of the tank when filled to depths divisible by this increment, 6, 12, 18, 24 in., etc., and mark the volume on the gage pole at these various depths. Then the volume of fluid in a tank may be read directly from the gage pole at the level to which the fluid rises on the pole when it is placed vertically in the tank.

Derivation of Curve

In Fig. 2, the circle is used to denote a cross-section view of a horizontal cylindrical tank filled with fluid to a depth y_1. If a layer of fluid of infinitesimal thickness, dy, is assumed at some position intermediate between the bottom of the tank and the surface of the fluid, then the volume of fluid in the tank represented by the depth dy is expressed by 2xdyL, where L is the length of the tank and x is one-half the width of the layer in inches. The volume of fluid in the tank may be deter-

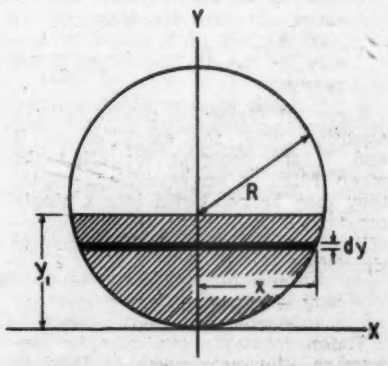


Fig. 2

mined by a summation of all such infinitesimal volumes which may exist between the bottom of the tank and the surface of the fluid. Thus, $V = 2L\int_0^{y_1} x\,dy$. Since the equation of the circle in Fig. 2 is $X^2 + Y^2 - 2RY = 0$, $X = \sqrt{2RY - Y^2}$, and by substituting this value of x in the first equation the volume may be expressed as $V = 2L\int_0^{y_1} \sqrt{2RY - Y^2}\,dy$.

Integrating this equation, the volume of fluid in the tank when filled to a depth of y_1 inches is found to be expressed by the equation

$$V = L[(y_1 - R)\sqrt{2Ry_1 - y_1^2} + R^2 \text{ vers}^{-1}(y_1/R)] \quad (1)$$

Since y_1 in the above equation represents the depth of fluid in the tank, the letter d may be substituted in order to make the equation more easily followed. The equation gives the volume in cubic inches, so in order to obtain the volume in gallons it is necessary to divide the entire equation by 231, the number of cubic inches in one gallon.

$$V = \frac{L}{231}[(d - R)\sqrt{2Rd - d^2} + R^2 \text{ vers}^{-1}(d/R)] \quad (2)$$

Where:

V = volume of fluid in gallons
R = radius of tank in inches
L = length of tank in inches
d = depth of fluid in tank in inches

If the depth of the fluid is now assumed to be a given fraction of the radius of the tank, the equation may be considerably simplified. For example, if the tank is assumed to be filled to a depth equal to the radius of the tank, it is half full, d = R, and the equation becomes

$$V = \frac{L}{231}[(R - R)\sqrt{2R^2 - R^2} + R^2 \text{ vers}^{-1}(R/R)]$$

But vers^{-1} (1) is equal to $\pi/2$ radians and the above equation becomes

$$V = \frac{L}{231}\left[0 + R^2\frac{\pi}{2}\right] = \frac{\pi R^2 L}{2 \times 231}$$

Since all factors in this simplified equation with the exception of R and L are constant for all tanks when filled to an equivalent depth, they may be combined into a single constant, C, called the volumetric coefficient, and the equation further simplified to

$$V = C R^2 L = C D^2 L/4 \quad (3)$$

These constants can now be determined for any depth of fluid in any tank by assuming various ratios of depth of fluid to radius of tank and solving equation (2) in a manner as described above. Table 1 presents these calculated values. When constants at representative ratios of depth to radius have been obtained, a graph may be plotted showing the relation of these constants to the ratio of depth to radius. Fig. 1 is such a graph with the exception that the ratios of depth of fluid to DIAMETER of tank have been used. From this graph may now be obtained a constant for any depth of fluid in any horizontal cylindrical tank. By use of these constants in equation (3) the volume of fluid in the tank may be quickly and simply determined from the known depth of fluid.

The use of this graph involves less calculation in determining volumes than any method yet devised and is simple enough to be employed by those with only a slight knowledge of mathematics. Calculations based on this graph are accurate to within a fraction of 1 per cent. The accuracy of measurements, however, will be affected by inclination of the tank from horizontal, presence of baffles or piping in the tank, accumulation of sand or b.s. in the tank and spherical ends of the tank.

TABLE 1—Volumetric Coefficients

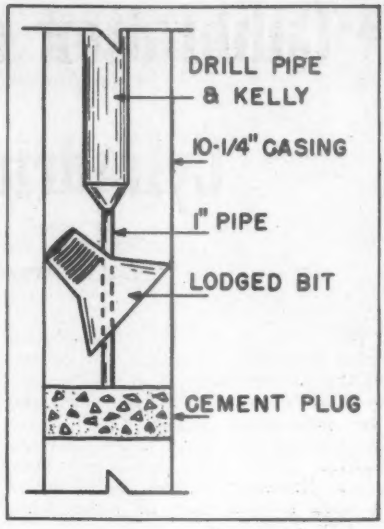
Ratio—depth/diam.	Decimal equivalent	Volumetric coefficient
0	0	0
1/16	0.0625	0.000354
1/8	0.1250	0.000981
3/16	0.1875	0.001765
1/4	0.2500	0.002658
5/16	0.3125	0.003625
3/8	0.3750	0.004657
7/16	0.4375	0.005721
1/2	0.5000	0.006800
3/4	0.7500	0.010941
1	1.0000	0.013600

Cement Plug Aids in Recovery of Dropped Bit

AN UNUSUAL fishing job on a deep West Texas well was conducted recently when an 8¾-in. bit was recovered from a well. The bit dropped in the hole when it was rotated too much during the process of breaking it out preparatory to replacement. Unfortunately, the crew forgot that the bit-breaker did not have a bottom in it and the bit was rotated until it was free from the drill collar. It dropped through the rotary, into the surface pipe and started toward bottom.

Fortunately, one of the cutting members caught in a collar in the surface pipe approximately 70 ft. below the surface. In addition to a fairly long string of surface pipe, there were several thousand feet of open hole.

After the bit was located, an electric light was lowered into the hole and the crew on the surface could examine the situation. It was seen that the bit could be lifted and freed and pulled from the hole; however, if the bit should drop, its recovery would probably be more difficult.



It was decided to run a cement plug immediately below the bit to catch it in case it should be dropped while attempting to recover it. Unfortunately, an exposed gas sand below the surface pipe caused agitation of the quick-setting gypsum-cement slurry and several attempts had to be made before a firm plug was obtained. The plug was run by installing a 1-in. tail pipe on a joint of pipe and the kelly joint.

After the plug had set, a grappling tool operated by hand was run in the hole and the bit picked up and pulled from the hole. After the cement plug had set, only a few hours were required to recover the bit. The plug was then drilled out and drilling resumed.

BOOK REVIEW

The Oil and Gas Resources of New Mexico, second edition. By Robert L. Bates, State Bureau of Mines and Mineral Resources, Socorro, N. M. 320 pages, maps and cross-sections, Price $2.50.

This bulletin gives a complete account of New Mexico's productive and prospective oil areas and brings Dean E. Winchester's earlier edition up to date. Numerous maps and structure sections portray the various producing and nonproducing structures and the editor has included descriptions of many fields by company geologists most familiar with operations. The bulletin is essential for the shelves of any person wishing an introduction to the oil business in New Mexico.

ISOMERIZATION—

A useful but as yet little used tool for the refiner

by Arch L. Foster

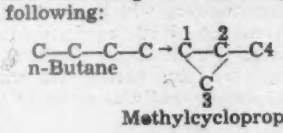
PART 2

Isomerization has been used chiefly as a means of obtaining isoparaffins for use in other syntheses such as alkylation of aviation fuel components. It also may be and is being used as a reaction for production of finished products, such as neoparaffins and other iso compounds, for the improvement of motor fuels.

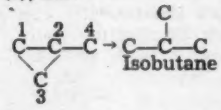
Several complicated isoparaffins may be synthesized, theoretically and in many cases doubtless practicably, from normal paraffins, either by isomerization alone or by isomerization - alkylation or other process combinations.

ISOMERIZATION of n-butane to isobutane is the reaction most frequently employed now commercially, generally as an adjunct process to alkylation. The details of these processes are fairly well developed and understood and no general discussion will be given here. Pressures and temperatures are nominal and permit the use of relatively light equipment such as pumps, reaction chambers and fractionators. Power and heat requirements are low, since 25 to 50 lb. pressure and temperatures up to 250° F. are typical, although varying with the catalyst, nature of charge stock, desires of the operator for conversion rates, etc.

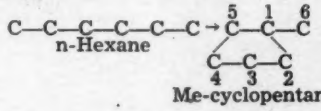
Several theories for the explanation of the isomerization reaction have been expressed, none of which have been accepted as a wholly satisfactory explanation. One idea is that intermediate cyclic compounds are formed according to something like the following:

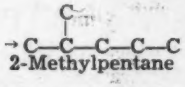


Methylcyclopropane then suffers breakage of the ring between carbons (1) and (3), as:

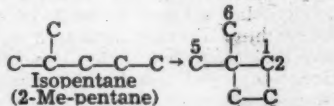


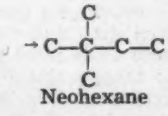
This reaction routine, however, does not explain satisfactorily the formation of isoparaffins with more than one side chain, unless we assume a stepwise series of reactions, each going through some variation of the cyclization-ring-cleavage system. For example, in making neohexane by isomerization, n-hexane may form methyl pentane as the first step, then cleave the ring between carbons (1) and (5):





This intermediate isohexane then again cyclicizes to dimethylcyclobutane, breaks between carbons (3) and (4) to form neohexane:





Both intermediate cyclization reactions are predicated on a greater reactivity between a terminal carbon and a secondary carbon, as carbons (1) and (2) in forming methylcyclopentane, and the tertiary carbon (1) and terminal carbon (4) in forming dimethylcyclobutane; and a stronger tendency to break secondary bonds, such as that between carbons (3) and (4) in dimethylcyclobutane, than to break other primary, secondary or tertiary carbon bonds elsewhere in the molecule of the intermediate compound.

Doubtless reaction conditions may be selected so as to promote these desired reactions (bond formations and breakages) to a greater degree than the more undesired reactions, and thus to increase the percentage of reactions forming the desired product. In any of these reactions an equilibrium undoubtedly exists between the percentage of various possible products formed. For example, isomerization of n-butane, or in treating any mixture of normal and isobutane an equilibrium is reached with about 20 per cent of normal and about 80 per cent of isobutane. Consequently it is necessary to separate the components and to recycle the unchanged fraction, if high yields are obtained. In practice the per-pass conversion employed is much smaller, 30 to 40 per cent being typical probably, which speeds up throughput and simplifies somewhat the difficult fractionation job but involving more recycle than if the reaction is allowed to reach equilibrium.

Improve Octane Number

Another explanation of atomic rearrangement—isomerization—is that under powerful catalyst influence bonds are "loosened" sufficiently to permit reallocation of methyl and other alkyl groups, without any of them ever passing beyond the sphere of influence of the molecule as a whole. Other theories are the formation of an olefin and a paraffin by molecular cleavage with reunion of the two: formation of radicals, alkyl, alkenyl, etc., and their recombination. In all such reactions the change is considered to be in the direction of a more stable form than the original molecule, as indicated by the exothermic nature of the reaction. The heat of isomerization is relatively small, showing that some activation by heat and catalytic influence is necessary to accomplish the result. Heats of reaction are low; for n-butane at 77° F., determinations range from 1,630 to 2,270 calories per gram-mole; in the range 158°-356° F., it is calculated to be 2,800 calories. (Egloff, loc. cit. p. 31.)

It is obvious that any of the isomeric hydrocarbons shown in the table are of high potential value as motor and aviation-fuel components. Two of these can be prepared from n-pentane which, treated with aluminum bromide, gives a 50 per cent conversion to isopentane — methylbutane—raising the octane number from 62 to 92 research method. Using promoters such as HBr, HCl and BF_3 with $AlCl_3$ gives more isobutane along with isopentane. A 27 per cent yield per pass of isopentane is obtained with aluminum chloride and HCl at

about 400° F. and 300 lb. pressure. Other catalysts which have been mentioned include $AlCl_3$ hydrocarbon complexes with chlorsulfonic and fluorsulfonic acids, etc. Equilibrium mixtures of normal and isopentane with aluminum halides indicate 90 per cent of the iso form at 0° C., (32° F.), and above 70 per cent at 80° F. Preparation of tetramethyl-

methane—neopentane, —, is expected to result from isomerization of pentane at about 80° F., with heat of reaction of about 4,680 calories per gram-mole. This product is very stable even with strong catalysts.

Isohexanes

n-Hexane is converted to 50 per cent or more of isohexanes with $AlCl_3$ and HCl at 160° F. Equilibrium mixture of the isomers at 80° F. is estimated to contain 75 per cent methylpentanes, 20 per cent dimethylbutanes and 5 per cent n-hexane. Isomerization of isohexanes to neohexane had not shown too high promise in work reported prior to the Indiana announcement in January 1943.

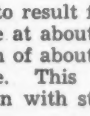
Recent unpublished research data indicate that cycloparaffins, while their clear octane number determined by established standard methods may not be as high as those obtained with branched-chain isoforms, have a peculiar and desirable effect on engine performance the cause of which has not been adequately explained. Possessing naphthenic characteristics, especially when the ring is garnished with side chains, the probable presence of these ring paraffins in catalytically cracked fuels aids partially in explaining the cause of if not the reasons for the peculiarly advantageous performance of these fuels under extreme performance demands so important in aerial warfare. Therefore research to work out methods for commercial production of these cycloparaffins and naphthenic hydrocarbons appears to be one of the promising roads for fuel development in future.

Higher Isoparaffins

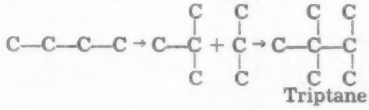
When isomerizing higher paraffins a tendency to form lower-molecular-weight isoparaffins appears. Treatment of n-heptane with $AlCl_3$ gave 25 per cent of pentanes and lower, at about 212° F., 1.5 per cent and less of each of several isoheptanes, about 10 per cent of polymer products and 60 per cent unchanged n-heptane. At 104° F. 13 per cent of isomers has been obtained.

Isomerization of n-octane with aluminum halides plus hydrogen halides increases yields up to about 33 per cent at about 284° F., with formation of higher and lower paraffins. Increases in temperature promote both higher percentages of isomerization and chain cleavage in the higher paraffins. Octane appears to break off ethyl rather than methyl groups; the presence of these groups increases the tendency not only to form higher isoparaffins but to synthesize those of lower molecular weight and may explain in part the formation of methane-to-butane products.

Synthesis of the heavier isoparaffins shown in the table, as 2,2-dimethylpentane and below, may prove simpler by a combination of isomerization and alkylation than by isomerization alone. Triptane, for ex-

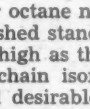


ample, —, may be considered an alkylation product of isobutane and propene, the secondary carbon of propene joining directly with the tertiary carbon of isobutane. Such a product theoretically can be produced by isomerizing n-butane and alkylating it with propene:

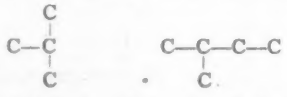


Triptane

Correspondingly, 2,2,3,3-tetramethyl-



pentane, —, with extremely high antiknock properties, may be considered a combination of



isobutane, and 2-methylbutane (isopentane).

Union of these molecules between their tertiary carbons is required to effect this synthesis. Isomerization of n- to isobutane and of pentene-3 to isopentene-3 are relatively easy reactions to complete satisfactorily. The major problem in this instance is to induce the tertiary carbons in each to combine directly. Research so far has indicated that under the conditions employed less highly branched isomers are more likely to result.

Research Possibilities Enormous

This hasty review of a few of these possible reactions and syntheses makes no claim to do more than give a glimpse of the possibilities. It requires no great mental caliber to see that the potential field for such research and subsequent commercialization of isomerization reactions either alone or in combination with alkylation or other reactions is an extremely large one, and one which may be directed toward the immensely practical result of further improving internal-combustion engine fuels for the widely enlarging applications during and after the war. Possibilities for the use of the isomerizing reaction in the preparation of intermediates for chemical synthesis of all manner of commercially important or potentially important compounds are if possible more attractive to the researcher than in the engine-fuel field. In the development of new dyes and new syntheses for old types of organic dyes gradations in results and properties by variation of the configuration of the molecules and radicals for addition to base products is enormous. Polymerization of lighter to much heavier molecules of the lubricating-oil type, alkylation and isomerization to attain the same result offer opportunities to the research chemist and to the wide-awake refiner which can be appraised only tentatively with our present scant knowledge of hydrocarbon chemistry.

Isomerization is a useful tool for the refiner, and its possibilities have been utilized so far to only a very small degree. The researcher as time goes on will show the way to any number of new and useful applications of this reaction.

Pump-Station Practices

(Continued from Page 44)

culated through them by pumping than with thermo-siphon control of circulation.

Since the beginning of the war some steps have been taken to prepare for the possibility of sabotage. For this contingency some pipe-line organizations have developed special fire-fighting units. One example of these is a unit mounted on skids carrying extinguishing material and a 20-hp. engine, driving a 3-in. positive displacement rotary pump. This is to be used with a 4-in. suction hose, 15 ft. long, for picking water from ditches or hydrants. This unit together with axes, buckets, hand fire extinguishers and an extension ladder reaching 30 ft. is carried on a trailer. The whole outfit is painted red and placed in the open at a convenient point in the station yard where it may be easily reached in an emergency. On the station grounds, there are regular connections with water lines. In addition to this unit there is a hand-drawn cart, carrying buckets of extinguishing material as well as empty buckets which can be used by hand for carrying water.

In an emergency, such as a bad break or tank fire, it may be necessary to shut off drain ditches and throw up dikes quickly. To be prepared for such occurrences, a large station has on hand 100 shovels and 100 sharpshooters which are kept in the warehouse. With modern equipment available now, gang plows are effective for the earthwork which must be done rapidly at times of disaster.

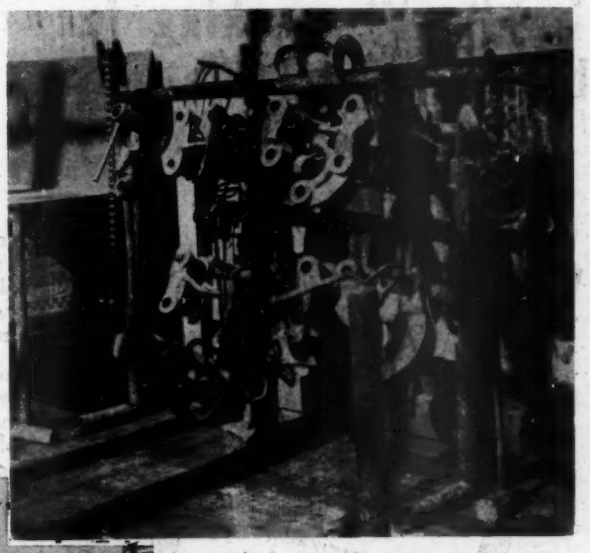
OPERATING IDEAS

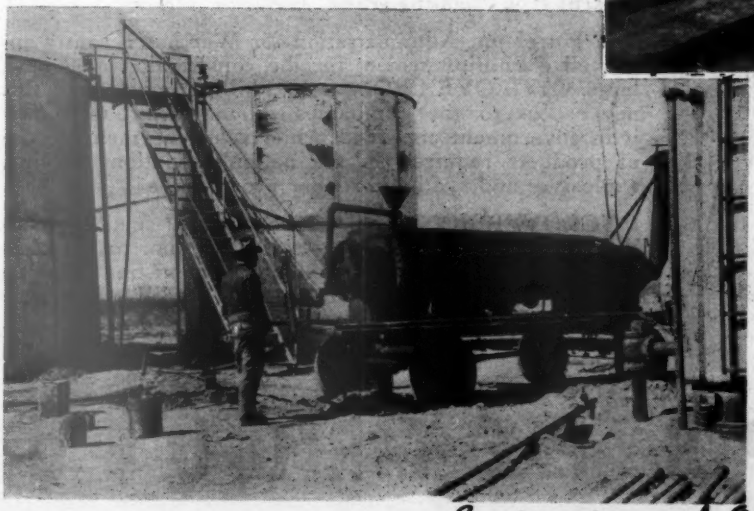
Rack Provided for Tong Heads

MODERN rotary drilling practice calls for a number of drill collars on the bottom of the string, or the bottom section may include a number of joints of a larger-size pipe. This requires that either a tong be used which will fit all sizes of pipe or that different size heads be kept on the rig. The photograph shows the method used by one drilling crew for taking care of the tong heads when they are not in use. The pipe frame has a number of steel pegs inclined at about 15° and the pin holes in the tong heads are slid over these. The rack is also handy for storing other incidental equipment.

Scraper for Cleaning Tubing Is Easily Operated

IN a pool being produced mainly by gas lift the high-pressure gas supply is not sufficiently dehydrated and a scale forms on the tubing and casing. When this scale drops off it gets into the gas-lift control mechanism. Removal of the scale from the tubing has been found to be helpful and a special tool has been designed for this work. A split steel ring about 8 in. in diameter and with about a 3½-in. opening is equipped with handles and a hanger. Inside the ring there are short sections of ⅝-in. sand line. The ring is placed around the tubing and the wire-line ends held against the tubing by closing the handles. Raising and lowering the tubing through this scratcher removes the scale.

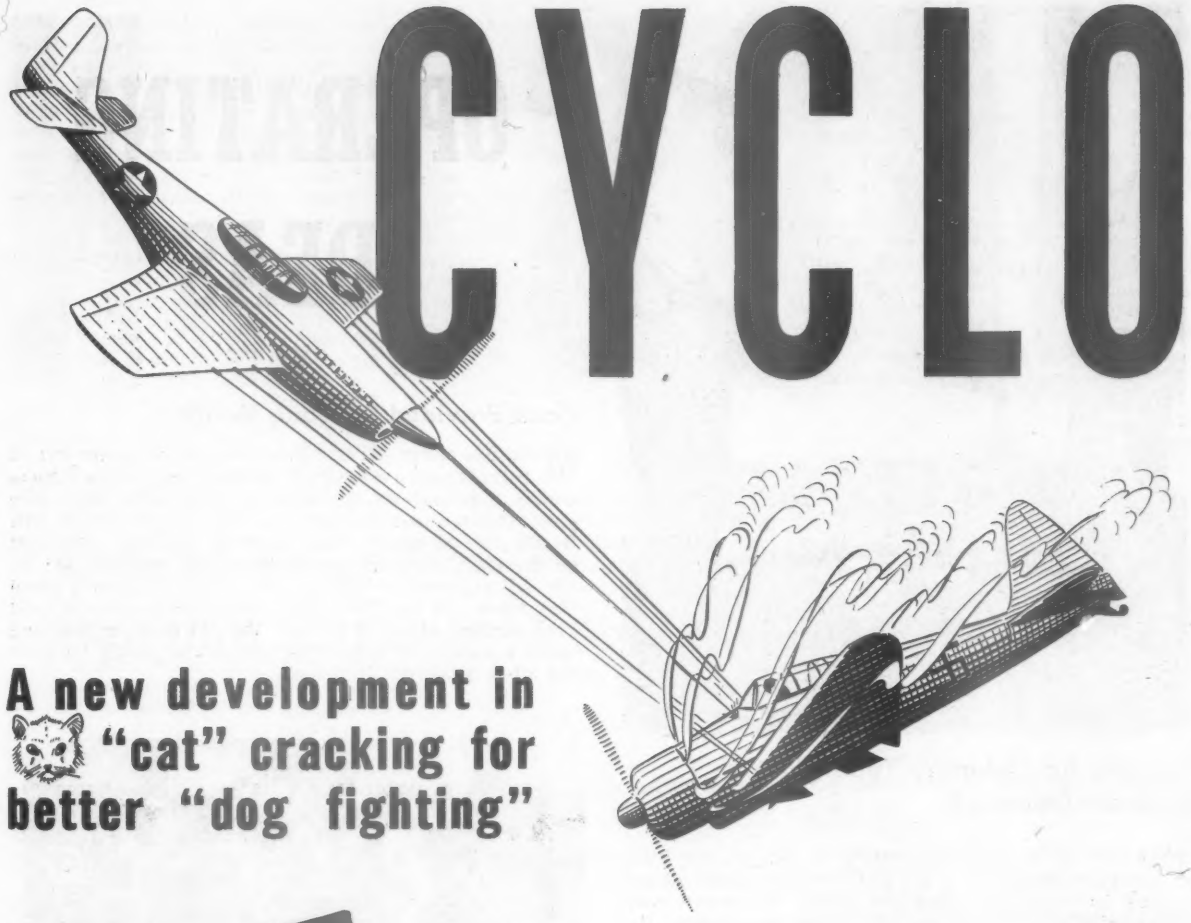




←Portable Heater for Treating Oil

THIS portable heater can be used for treating oil where no permanent facilities are installed. Essentially it consists of an oil-fired heater and a pump for moving the oil from the tank, through the heating coils and back into the tank. The oil is circulated until the entire tank has reached the desired temperature; chemical treating compounds are added before the treatment begins. Wheel-mounted, the arrangement is particularly handy for isolated tanks of bad oil.

CYCLO



A new development in "cat" cracking for better "dog fighting"

CYCLOVERSION is just one of the many Phillips processes available to you!

Isoversion
Gas Reversion
Alkylation
Isomerization
Polymerization
Dehydrogenation
Hydrogenation
Superfractionation
Desulfurization
Copper Sweetening
Extraction Processes

More and better aviation gasoline . . . greater quantities of essential ingredients for synthetic rubber and for explosives . . . all result from CYCLOVERSION—a new development in catalytic cracking which Phillips Petroleum Company has put into use at one of its refineries.

While it is feasible, by means of CYCLOVERSION, to build aviation gasoline which greatly exceeds existing standards for 100 octane fuel, the important, immediate application for the process is to increase production of present type "fighting-grade" fuel.

The Petroleum Administration for War has recently approved a Phillips project for the construction of a new, large CYCLOVERSION unit. Phillips now offers this new process to other companies who may desire to employ it in government approved projects for the manufacture of products required in the nation's aviation gasoline, explosives and synthetic rubber programs.

CYCLOVERSION requires substantially smaller quantities of critical construction materials than many other catalytic processes. A large number of existing catalytic and thermal cracking installations are readily convertible to CYCLOVERSION.

PHILLIPS PETROLEUM C

VERSION

Another PHILLIPS contribution toward greater production of needed war materials

CYCLOVERSION converts naphthas or other petroleum distillates into products having high percentages of aromatic hydrocarbons. These products, when blended with other aviation stocks, greatly improve the flight performance of finished aviation gasoline —a "cat" product which makes for better "dog-fighting"!

The new process employs an inexpensive catalyst in fixed-bed reactors and a relatively minor quantity of critical material is required to equip modern petroleum refining facilities to utilize the new development. The flexibility of CYCLOVERSION, both in regard to type of feed stocks which it will successfully handle and to final products which can be manufactured by alterations in operating conditions, makes the process particularly advantageous under today's fast-changing War conditions and for the future's unknown conditions.

Write or Wire

PERCO DIVISION

M **COMPANY** *Bartlesville, Okla.*

QUESTIONS on TECHNOLOGY

by W. L. Nelson

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Questions should be submitted in as much detail as possible. Inquiries must be signed, but only the given initials will be printed. The source of the question is considered to be confidential. Questions requiring a discussion of patents, extended computations, or a detailed study cannot be considered. When the matter is of general interest, a reply will be published within a reasonable time.

W. L. NELSON

The Material 1,3-Butadiene, Its Storage

What are the chemical and physical properties of butadiene? Can it be stored in open vessels and what keeps it from forming rubber?—R. A. M.

It would seem that almost the exact information that you desire is given in the recent Research Bulletin 7381-B of the Mellon Institute of Industrial Research entitled, "The Storage of 1,3 Butadiene." This bulletin is available through the Pittsburgh-Des Moines Steel Co. of Pittsburgh, Pa., or Des Moines, Iowa. Much of the following material may be found in the bulletin.

The rate of polymerization of butadiene is related to the temperature being extremely slow at 30°-40° F., but extremely rapid at temperatures of 80° to 100° F. A simple polymerization or more specifically dimerization to 3-ethenylcyclohexene seems to occur regardless of the use of normal inhibitors but the formation of high molecular weight polymers (similar to rubber) may be slowed by the use of inhibitors. Some of these inhibitors are hydroquinone, tricresol, phenyl-β-naphthylamine, diarylamines, tertitary butyl catechol, and 1,8 diaminonaphthalene — antioxidants somewhat similar to those used as inhibitors for cracked gasoline. Such agents are used during shipment and storage but must be removed before copolymerization into synthetic rubber latex can be accomplished.

Air, oxygen and peroxides catalyze the polymerization but such oxides as those normally found in mill scale or rusted steel appear to have no effect. Copper, aluminum, lead and their alloys are said to cause polymerization. It seems that none of the more active catalysts that are used for the purpose of polymerizing butadiene into synthetic rubber would be present in storage equipment or facilities. When stored in the dark at low temperatures, little polymerization occurs even during months of time.

Pure butadiene does not corrode steel, iron, stainless steel or tin plate, but moisture in the butadiene is thought to cause corrosion of steel. In storing butadiene the ideal procedure is to cool the material to 32° F. by refrigeration, pump into an insulated vessel and maintain at 32° F. during the entire storage period. At 32° F. butadiene exerts a vapor pressure of about 3 lb. per sq. in. gage, while at 80° F. the vapor pressure is about 190 lb. per sq. in. gage—and a hence a low storage temperature is advantageous from a mechanical standpoint as well as from the standpoint of polymerization.

Aromatic Petroleum Naphtha For Aircraft

One of the aircraft companies wishes us to supply aromatic petroleum naphtha for use in cleaning compounds and as a diluent for protective coating materials. Will our Mid-Continent naphthas do for this?—M. N. R.

It is presumed that you refer to wash thinners or the petroleum naphtha which may constitute 40 per cent or more of such a thinner. Such materials are used for rinsing and cleaning in the paint shop, particularly for cleaning primed surfaces before applying finish coats. In addition, aromatic petroleum naphtha may be used in the compounding of organic protective coatings.

The specifications of such materials are not readily available under present conditions but if a bona fide inquiry has been received it will doubtless be possible to obtain detailed specifications from the proper government offices of the Air Corps, Naval Intelligence, or Army Ordnance.

The properties of aromatic petroleum naphthas are somewhat as follows:

A.P.I.	25- 42
Initial b.p., °F.	190-340
50 per cent b.p., °F.	212-392
End point	285-425
Flash point, °F.	Low to 122
Kauri-butanol No.	56- 72

Such specifications, particularly the Kauri-butanol number, indicate an extremely high content of aromatic hydrocarbons, perhaps ranging from 60 to over 80 per cent of aromatics. It would seem that in some instances the addition of toluene to the petroleum naphtha might be necessary.

In general the naphtha would have to be derived from a naphthenic or aromatic type of crude oil and with most crude oils the incorporation of aromatic extracts by such processes as the Edeleanu process, would appear to be necessary. This points to the crude oils of the California or Gulf Coast as a source for such naphthas.

Washing or thinner fluids are mixtures of such materials as aromatic petroleum naphtha, toluene, methyl-ethyl ketone, alcohol, ethyl acetate, etc. The petroleum naphtha usually constitutes more than 40 per cent of the mixture but a smaller amount might be necessary if the petroleum naphtha is low in aromatic hydrocarbons. Obviously, such materials must be noncorrosive by the copper strip test, free from acid, free from obnoxious odor, and reasonably stable with respect to oxidation. Other more direct or practical tests, such as spot tests, evaporation tests, rubbing tests (on coated surfaces) or the softening effect on painted surfaces, are important in connection with specific uses.

COST OF DIRECTIONAL DRILLING

DRILLING a well directionally represents an additional investment over and above the cost of usual drilling operations. An operator who decides to make this additional investment is doing this, after careful consideration of all the factors involved, with full realization that this additional cost represents a good investment. Decision to drill a well directionally may be made either before the well is started or, directional drilling may be resorted to, at any stage of the program of drilling operations. In the first case the decision was probably made because no well could have been drilled, under given set of conditions, without use of directional drilling. In other words the additional cost is a premium being paid for ability to secure a well on a given location. In the second case directional drilling was probably necessary because available data indicated that by directional redrilling a producer may be made from what apparently would be a dry hole. In other words the additional cost of directional drilling is used in this case to save the investment already made in the well.

As any other routine operation, and directional drilling did become a routine operation in many oil fields of the country, the directional drilling is a problem in cost from two points of approach. First, in planning directional drilling of a well, advance estimates of cost are needed. Second, actual performance of work has to be accomplished in an efficient and workmanlike manner with minimum outlay of money.

Advance estimates of cost of directional drilling are difficult. There are simply too many unknown and variable factors involved to permit setting up of standards for such estimates. Among the factors those most apparent are; drilling conditions with particular reference to type of formations to be penetrated by the well, type of structural deposition of these formations, position of the bottom-hole location to be attained in relation to the surface location, skill with which the directional drilling technique is applied by drilling crews and many others. Even when all these factors can be quite closely evaluated in advance, because of experience gained from drilling a large number of directional wells in any given area, there always will be other factors which cannot be predicted and considered in advance. For instance in a certain well one setting of deflecting tools may turn the well in the desired direction and may result in establishing a trend which the well will maintain without outside help. In another well an apparently perfectly good setting of a deflecting tool may fail to bring the results expected. This would necessitate additional settings of deflecting tools or use of bit control methods and would result in considerable increase in cost over the one expected in advance estimates.

As previously stated the cost of drilling a directional well consists of the cost of normal drilling operations and of the cost of operations incident to and resulting from the fact that the course traversed by the well is being controlled. This latter cost can be subdivided into two groups: (1) cost of the use of deflecting tools and of operations more or less directly connected with this use and (2) cost of additional rig days necessary for performance of these or other directional operations.

Company or Outside Service

In estimating the cost of use of deflecting tools consideration should be given to the fact whether services of the technical service company are to be used or whether company owned tools are to be employed. In the first case the cost would consist of following charges: (1) charge for setting the deflecting tool, (2) fee for services of a trained operator, (3) charges for miscellaneous tools used in connection with deflecting tools, (4) mileage charge for technical service company's car. If company owned tools are to be used cost would consist of following items: (1) royalty which is usually paid on use of such tools, (2) depreciation to amortize the investment in purchase of tools, (3) charges for time of man, outside of drilling crew and normal field supervisory personnel, who is sufficiently conversant with the technique of directional drilling to supervise the operations on the particular job.

In either case the charges are more or less fixed. In estimating the cost the problem resolves itself in determining how many settings of the deflection tools can be reasonably expected and over what period of time the related charges will accrue.

Attempts have been made to arrive at averages of expectancy of satisfactory footage per one setting of the deflecting tool. As previously stated however there are too many factors involved to permit setting up of general standards. At best it will be possible to make only a general estimate based on data secured from other wells drilled directionally in the same area.

Estimate of time through which the rig day charges for all directional operations will accrue is very important since the rig day cost represents by far the largest portion of the total directional cost. At this point the estimate has to take into consideration the efficiency and degree of economy with which the operations can be expected to be performed.

The efficiency of operations, resulting in decrease of the total directional drilling cost, will follow careful application of certain fundamental principles:

1. Maintaining of proper balance between use of deflecting tools and of bit control methods. These methods depend for control of the drift of a well on use of full or under-gage bits on use of different degrees of flexibility of drill collar assemblies, on changes in weight imposed on the bit and on changes in rotating speed. The methods are quite successful in many cases, too often however there may be a tendency to economize by trying these methods over too long period of time in order to avoid setting of the deflection tool. In many cases this is false economy since charges for rig days, used in experimenting with the methods, accumulate very rapidly.

2. Taking advantage of the natural tendency of a well to drift in a certain way in a given area. This is particularly true if the well is drilled directionally from the beginning and surface location can be selected in proper relation to the bottom hole location to be attained.

3. Starting directing the well at an early stage of drilling operations. Quite often the start of directional drilling is postponed in hope that the well may take the desired drift and that the directional drilling expense may be avoided. It is much more economical to lay out in advance the easiest path that the well should follow and to direct the well accordingly than to plug back or to be obliged to make necessary turns after the well is close to its objective as far as depth is concerned.

4. Thorough training of drilling

crews and creating their interest in the job by keeping them informed of the progress being made.

5. Careful planning and attendance to details.

The following discussion analyzes eight actual cases of such operations reducing the directional cost to cost per foot of the total depth of the well.

The table given below is self-explanatory. It may be well however to point out that "Rig Days of Directional Operations" represents those 24-hour periods which were devoted exclusively to directing the course of the well. In other words the period necessary for completion of any of these wells would have been shorter by that many days if only normal drilling operations were employed. The cost per rig day has been assumed as $300 and includes labor, fuel, depreciation, maintenance and miscellaneous. This cost may of course vary but was on the average approximately correct for the operations involved. Following is brief discussion of the individual cases shown in the table:

Well No. 1. The well was drilled several years ago on a gently sloping monoclinal structure of the Texas Gulf Coast. Flatness of deposition of the beds and their character made conditions favorable for directional drilling. The well was drilled on a narrow strip of a property and the purpose of directional drilling was to prevent the possibility of subsurface trespass. At 1,400 ft. deflecting tool was set, since the trend of the course of the well indicated that the well might leave the subsurface boundaries of the lease. The same operation had to be repeated at 3,600 ft. The directional cost per foot is rather high for this type of drilling conditions and was caused by unsuccessful attempts to turn the well by bit control methods before second deflecting tool was set.

Well No. 2. This case covers directional drilling of a well in a piercement-type dome field, very close to the salt mass. The problem was to bottom the well on the specified contour of the producing sand and the surface location was chosen in such a manner as to take advantage of the expected normal drift of the well. Only one correction with a deflecting tool was needed resulting in a very satisfactory per foot cost.

Well No. 3. This was a location adjoining well No. 2. The case is given to show that under similar conditions similar results may quite often be expected.

Well No. 4. Due to the difficulties experienced in holding the course of the well after two settings of deflecting tools the directional cost per foot was high. This was a new well drilled also close to the salt mass in a piercement-type dome field. The well was completed in salt as a dry hole.

Well No. 5. After well No. 4 was completed as a dry hole it was decided to redrill the well away from the dome for completion in a deeper sand. The well was plugged back, the deflecting tool was set on the plug and the well was redrilled being completed a considerable distance away from the dome. Since the direction in which the well had to be drilled did not coincide with the normal tendency of drift of wells in this area considerable difficulties were expected. However only one, original, setting of the deflecting tool was needed. The well continued without outside help in the desired direction. This accounts for the cost per foot which is very good for this kind of conditions. Five days of rig time include the plugging back operations.

Well No. 6. This was a new well to be completed under an inaccessible surface location in a piercement-type dome field. The surface location from which the well was actually drilled was selected so as to take advantage of the drift tendency. Two settings of deflecting tools were needed but rest of the progress was normal and the cost was satisfactory.

Well No. 7. This was a workover of an old well in a piercement-type dome field. The 7-in. casing was cut under surface casing and plug was set. The object was to complete the well at the depth of 4,400 ft. within a given circle 100 ft. in diameter.

Three settings of deflecting tools were needed. The rig days required for these operations, together with rig days used for setting plug and bit control methods added to a total of 11 days bringing the per foot cost to a rather high figure.

Well No. 8. This case was identical to that of well No. 7 except that the circle within which the well had to be completed at the depth of 4,400 ft. was 50 ft. instead of 100 ft. in diameter.

Although five settings of deflecting tools were made only four were actually effective since the fifth one, although apparently normal, failed to give any results. The cost per foot is high. Since, outside of the abovementioned one failure of the deflecting tool no special difficulties were encountered, the cost reflects simply the higher degree of precision which was needed to complete the well at the selected bottom hole location.

Average Well. The first part of this article pointed out the difficulties of arriving at any average standards of comparison for cost of directional drilling. Nevertheless with a group of data available there always is a temptation to calculate the averages in order to find how the individual cases compare with the average norm. Because of this fact an "Average Well" has been calculated for these eight cases and is shown in the last column of the table.

The eight cases discussed have been selected to illustrate the cost of directional drilling in its different applications. They all refer to comparatively shallow wells and seven of the wells were drilled in piercement-type dome fields. This narrows down the problem as far as depth and drilling conditions are concerned. Even within these limits however the "Average Well" should not be considered as a standard of comparison. This is easily understood when one considers that the per foot directional drilling cost of the "Average Well" is $0.66 while the costs of individual cases range from $0.27 to $1.18. The data presented could be of help in arriving at estimates only if all the conditions to be encountered are taken into careful consideration.

TABLE 1—Showing Directional Drilling Cost per Foot of Total Depth

	Well No. 1	Well No. 2	Well No. 3	Well No. 4	Well No. 5	Well No. 6	Well No. 7	Well No. 8	Ave. well
Number of deflecting tools set	2	1	1	2	1	2	3	5	2.12
Feet drilled per each setting	1,648	834	893	527	3,136	643	984	611	1,134.50
Rig days of directional operations	6	2	2	11	5	4	11	12	6.62
Total depth of well	4,696	3,374	3,429	3,682	4,460	4,290	4,488	4,451	4,108.75
Cost:									
Fee of technical service company	$1,040.74	$300.00	$460.00	$642.84	$324.43	$548.81	$1,104.79	$1,612.95	$754.32
Cost of rig days used for directional drilling	1,800.00	600.00	600.00	3,300.00	1,500.00	1,200.00	3,300.00	3,600.00	1,987.50
Total cost	$2,840.74	$900.00	$1,060.00	$3,942.84	$1,824.43	$1,748.81	$4,404.79	$5,212.95	$2,741.82
Cost per foot of depth of well	$0.61	$0.27	$0.31	$1.07	$0.41	$0.41	$0.98	$1.18	$0.66

Engineering Fundamentals

No. 72

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

PROBLEMS INVOLVING HUMIDITY

THERE are many practical engineering problems that arise when dealing with air or gas which require a complete knowledge of humidity. This phase of subject matter is of wide application in problems of air conditioning, drying, weather analysis, and other lines of work.

In the oil industry, such information must be applied to certain problems of gas compression and transmission, gas combustion, heating value determination, gasoline plant design, etc.

Such considerations are of particular importance in the pipe-line transmission of natural gas under high pressure. In such situations water condensate may interfere with the flow of gas in the line. This interference is due, not only to the presence of liquid water in the line, but is sometimes caused by the presence of solid gas hydrates formed in the line from the combination of condensed water with other constituents of the gas. These solid hydrates may cool in sufficient quantity to reduce the capacity of the line or may even plug the line completely. Example 2 will illustrate calculations that can be made in order to determine the proper cooling temperature to which a gas must be subjected following compression in order to prevent condensation in the compressor discharge line at some point far removed from the compressor discharge.

Example 1—A Combustion Problem

Problem.—The air entering a boiler has a relative humidity of 70 per cent. Atmospheric pressure is 14.42 lb. per sq. in. Atmospheric temperature is 90° F. The gas used as fuel is 75 per cent methane and 25 per cent ethane by volume. It enters the burners with a relative humidity of 80 per cent. The gas enters the burners at 5.00 lb. per sq. in., gage, and 76° F. The amount of air actually used in the combustion is 30 per cent in excess of that theoretically required.

Calculate the volumetric percentage of water vapor in the flue gas from the boiler.

Solution.—Use as a basis 1 mol of fuel. From the combustion equations* for methane and ethane and the given data, the amount of air used per mol of fuel can be calculated as follows:

$$\text{Dry air used} = 1.3\,\frac{(0.75\times2+0.25\times3.5)}{0.209}$$

$$= 14.77 \text{ mols per mol of fuel.}$$

*Installment 60.

The flue gas from the boiler contains nitrogen, oxygen, carbon dioxide, and water. Now, calculate the relative amounts of each of these constituents in the flue gas.

N_2 : $(0.791 \times 14.77) = 11.68$ mols per mol of fuel

O_2 : $(0.209 \times 14.77) - (0.75 \times 2 + 0.25 \times 3.5) = 0.711$ mols per mol of fuel

CO_2 : $(0.75 + 2 \times 0.25) = 1.25$ mols per mol of fuel.

The water in the flue gas comes from three sources, namely: (1) moisture content of the entering fuel, (2) moisture content of the entering air, (3) water formed by combustion.

Now, calculate the water entering in the fuel. From the steam tables the vapor pressure of water at 76° F. is 0.444 lb. per sq. in.

Then the water vapor content in the fuel is

$0.444 / (14.42 + 5.00) - 0.444 \times 0.80$ or 0.019 mol per mol of dry fuel.

The vapor pressure of water at 90° F. is 0.698 lb. per sq. in. (From steam tables.)

Then, the water vapor content of the air is

$0.698 / (14.42 - 0.698) \times 0.70 \times 14.77$ or 0.526 mols per mol of fuel.

The water formed by combustion is $(0.75 \times 2) + (0.25 \times 3)$, or 2.25 mols per mol of fuel.

Then, the total water vapor in the flue gas is $(0.019 + 0.526 + 2.25)$, or 2.795 mols per mol of fuel.

The volumetric percentage of water vapor in the flue gas may be calculated as follows:

$$\text{Per cent water vapor} = \left(\frac{2.795}{11.68 + 0.711 + 1.25 + 2.795}\right) 100$$

$$= 17.00 \text{ per cent}$$

Example 2—A Gas Transmission Problem

Problem.—Natural gas as discharged from a compressor, before aftercooling, is at a pressure of 150 lb. per sq. in. gage and at a temperature of 150° F. The gas is saturated with water vapor. Atmospheric pressure is 14 lb. per sq. in.

1. To what temperature must the gas be cooled at the compressor discharge to prevent condensation of water in the discharge line at a remote point where the pressure is 100 lb. per sq. in. gage and the temperature is 50° F.?

2. When cooling as calculated in Part 1, how many gallons of water will condense in the aftercooler per million standard cubic feet of dry gas leaving the compressor?

Solution.—(1) From the steam tables (Table 1, Installment 31) the vapor pressure of water at 150° F. is found to be 3.716 lb. per sq. in., abs.

Then, the water vapor content of the gas is $3.716 / (150+14) - 3.716$, or 0.0232 cu. ft. per cu. ft. of dry gas.

From the steam tables, the vapor pressure of water at 50° F. is 0.178 lb. per sq. in., abs.

Then, at the remote point in the transmission line, the maximum amount of water vapor that the gas could contain would be

$0.178 / (100 + 14) - 0.178$,

or 0.00156 cu. ft. per cu. ft. of dry gas.

Now, the gas leaving the compressor must be cooled to a low-enough temperature that all water vapor in excess of 0.00156 cu. ft. per cu. ft. of dry gas will condense in the aftercooler. This after-cooler temperature is found as follows:

$$\frac{P_w}{(150 + 14) - P_w} = 0.00156$$

$P_w = 0.2554$ lb. per sq. in., abs.

Where P_w is the vapor pressure of water at the desired aftercooler temperature.

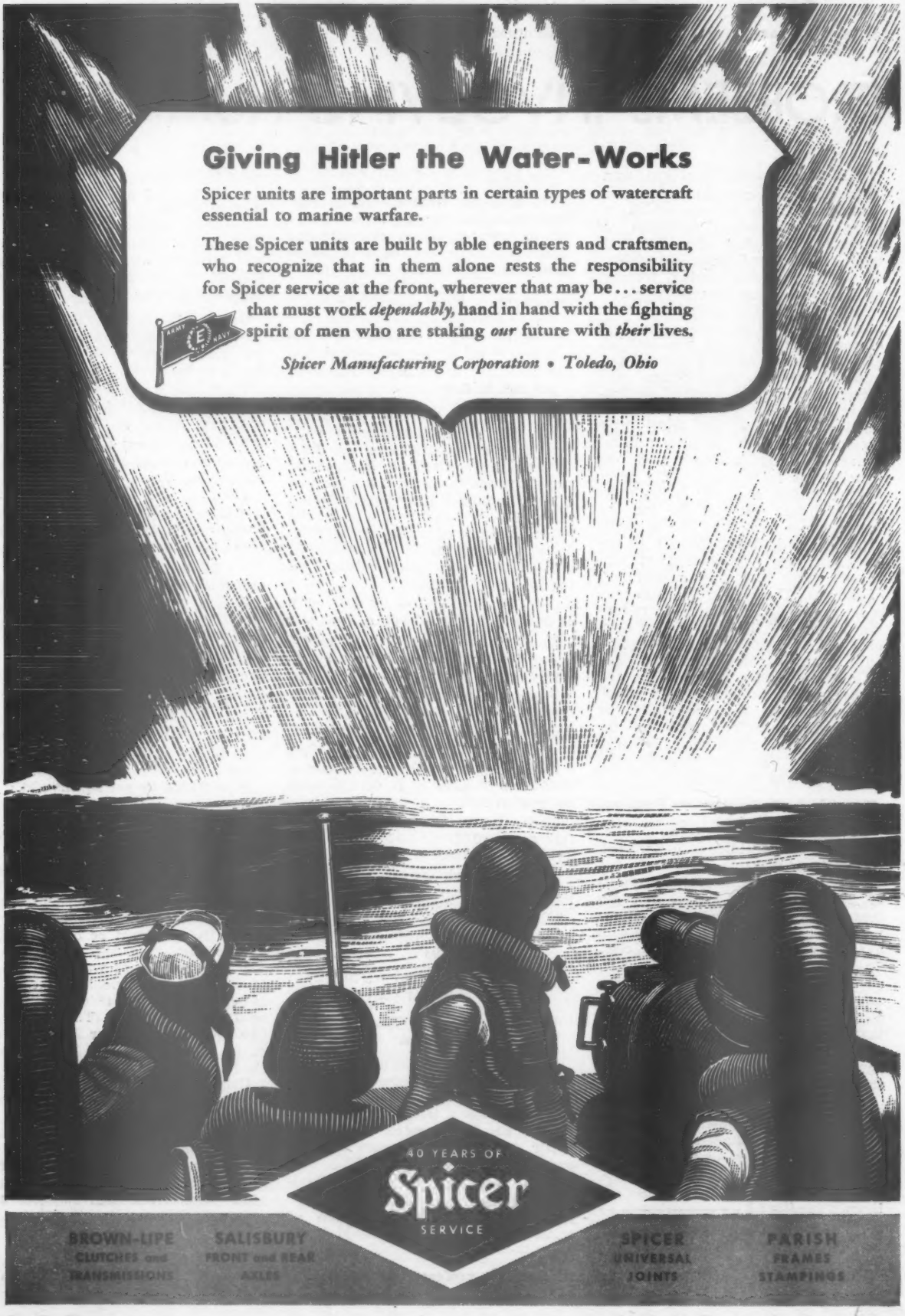
Using Table 1, Installment 31, it is found that this vapor pressure corresponds to a temperature of about 60° F., which is the temperature to which the gas must be cooled in the after cooler.

2. The amount of water vapor removed from each standard cubic foot of dry gas would be (0.02320—0.00156) or 0.02164 std. cu. ft. This would be $(0.02164 \times 1{,}000{,}000)$, or 21,640 std. cu. ft. of water vapor per 1,000,000 std. cu. ft. of dry gas.

Using standard conditions of 14.7 lb. per sq. in., abs., and 60° F., water vapor has a density of 18/379, or 0.0475 lb. per cu. ft., and water as a liquid weighs 8.34 lb. per gal.

Then, $21{,}640 \times 0.0475 / 8.34$, or 123.2 gal. of water would condense in the after cooler from each 1,000,000 std. cu. ft. of dry gas leaving the compressor.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma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A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

THE GAS COMPRESSOR

THE gas compressor is a widely used item of equipment in the oil and natural-gas industry. Its many applications include: (1) Compression of gas in a natural-gasoline plant for removal of the gasoline; (2) gas and air lift as a means of producing oil and water from wells; (3) repressuring and pressure-maintenance operations carried on for the purpose of stimulating or maintaining production; (4) input and booster stations on gas-transmission lines; (5) air-starting units for large engines; and (6) compressed-air units for operating rock drills on construction jobs.

A simple form of the reciprocating gas compressor is represented diagramatically in Fig. 1. It consists of a cylinder A, containing a close-fitting piston B driven by force exerted through the piston rod C. The particular type represented in the sketch receives its power in the form of rotary motion from a belt driven by an electric motor, an internal-combustion engine or similar prime mover. The rotary motion of the driven pulley and the crank shaft D is translated to the reciprocating motion of the piston rod, through the connecting rod E and the crosshead F. Another type of machine very commonly used in the natural-gas industry has the engine and compressor cylinders built into the same unit with the connecting rods from both the power end and the compressor end connected to a common crank shaft, equipped with a flywheel for smoother operation.

For the sake of simplicity the compressor in Fig. 1 is shown as single-acting; that is, gas is compressed on only one end of the cylinder. Most of the modern compressors used today are double acting; that is, gas is taken into the crank end of the cylinder while it is being discharged from the head end and gas is taken into the head end of the cylinder while it is being discharged from the crank end.

As the piston moves back from its head-end position due to revolution of the crank, the pressure in the cylinder space ahead of the piston will be reduced below the pressure existing in the intake space G just outside the suction valve H. Thus, the suction valve will be raised from its seat by the higher pressure underneath it and will allow gas to enter and fill the cylinder at a pressure about equal to that existing in the intake piping.

When the piston reaches the extreme crank end of its stroke and starts back forward due to the action of the crank, the suction valve will close. At this instant the gas has no escape if a higher pressure exists in the discharge space I. So, the gas in the cylinder will be compressed until its pressure slightly exceeds that of the gas in the discharge piping. At that time the valve J will be lifted from its seat by the higher pressure underneath it and gas will be discharged, for the remainder of the forward stroke of the piston, into the space I connected to the discharge piping. The piston then starts back toward the crank end at which time the discharge valve closes. The pressure decreases in the cylinder space until the intake valve opens and the same series of events is repeated.

The pressure and volume changes which occur in the cylinder of a gas compressor during one complete cycle (one revolution of the crank) may be represented on a P-V diagram as in Fig. 2. The P-V diagram is valuable as an aid in the analysis of the thermodynamic principles of compression. On the diagram, pressure is plotted as ordinate and volume as abscissa. From the diagram it can be seen that point A represents the value of pressure and volume at which the intake valve opens. Then as the piston moves further toward the crank end of the cylinder, gas is taken into the cylinder at constant pressure (intake pressure) until point B is reached. The line AB is commonly called the **intake period** of the compression cycle. As the piston starts back toward the head end of the cylinder, the decrease in volume and increase in pressure is represented by the line BC. This line is commonly called the **compression period.**

The point C on the diagram represents the value of pressure and volume at which the discharge valve opens and the discharge of gas from the cylinder begins. Gas is expelled from the cylinder at a constant pressure (discharge pressure) until the volume ahead of the piston is equal to that represented by point D on the diagram. The line CD is termed the **discharge period.** The piston is at the extreme head end of its stroke at point D. The volume coordinate of point D on the diagram represents the **clearance volume** of the compressor. The discharge valve of the compressor closes at point D as the piston starts on its stroke toward the crank end and the pressure decrease and volume increase in the cylinder is represented by the line DA. At point A the pressure in the cylinder has decreased sufficiently that the intake valve opens as already stated and the whole cycle of events is again repeated. The line DA on the diagram represents that part of the compression cycle called the **expansion period.**

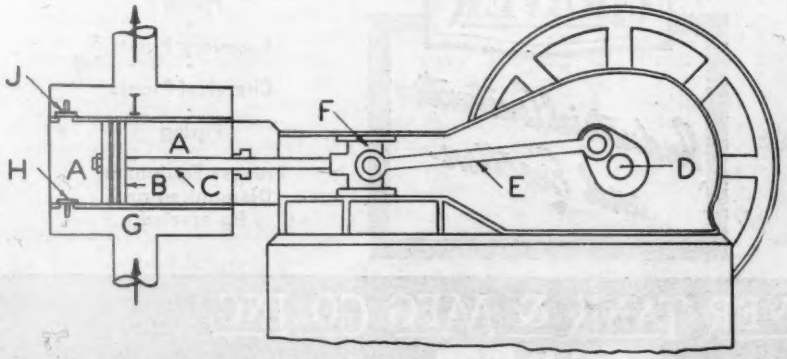

Fig. 1

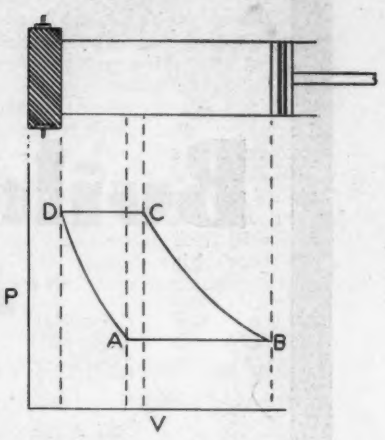

Fig. 2

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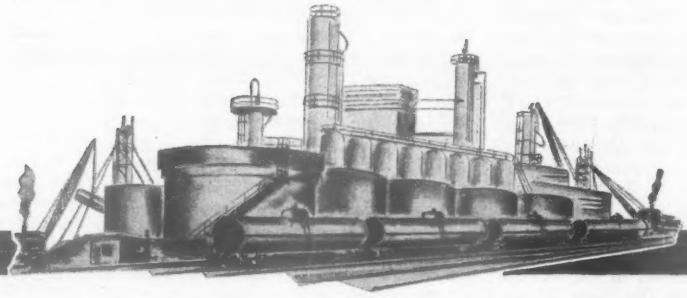

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Natural Gas

New Preference System Issued for Gas Companies

WASHINGTON, D. C.—A new preference-rating system for gas companies and other utilities has just been issued by the Office of War Utilities, recently created within the War Production Board to administer war activities of electric, gas, water, steam, and communications utilities.

The order, U-1, replaces the former P-46, but reenacts much of that regulation and governs the flow of materials into the entire field of utilities. It is the first industry order to be integrated with the Controlled Materials Plan.

It applies to companies supplying gas, natural or manufactured, directly or indirectly for general use by the public, exclusive of the production and transmission of natural gas up to the point of entry into gas-transmission lines from field gathering systems.

An important group of provisions within the order, designed to effect sharing of material and equipment in utility inventories, requires utilities to sell surplus stocks as a condition for continuing to receive priorities assistance. These provisions are linked with the creation of regional surplus-stock offices, to be in operation throughout the United States next month, through which utilities will carry on the redistribution of their surplus materials and equipment.

The order authorizes the use of a higher rating, AA-1, and a CMP allotment symbol, to permit utilities to obtain materials for maintenance, repair and minor construction. The order also, for the first time, brings under inventory regulation stocks of controlled material held by utilities for use in construction. It requires utilities to limit such holdings to their needs for the ensuing 60 days.

A sharp reduction in the inventory which may be held for maintenance and repair after March 31, 1943, is made in the new order.

Texas' Odorization Rule To Be Discussed March 9

AUSTIN, Tex.—Proposal of the Texas Railroad Commission that natural gas must be odorized so its existence can be detected when "such gas is present in the air in concentrations of as much as 1 per cent by volume" will be discussed at public hearing in Austin March 9.

The commission's previous order concerning use of malodorants in natural gas and liquefied petroleum gas to protect consumers against fire and explosion hazards by leaks was invalidated by the courts. The previous order was construed by the court as being too vague.

On liquefied petroleum gases, such as butane, the proposed new order calls for odorization when ½ or 1 per cent of gas is present in the air. The tentative order also would change regulations prescribing the method of converting natural-gas appliances for use with liquefied gas.

East Ohio Hearing Reset For April 7 By FPC Action

WASHINGTON, D. C.—The hearing previously set for March 3 has been postponed until April 7 for the purpose of determining whether East Ohio Gas Co., Cleveland, Ohio, is a natural-gas company within the meaning of the Natural Gas Act and investigating the cost of natural-gas service rendered by the company, including the cost of transportation of natural gas from the Ohio River to the city gates of Cleveland, Euclid and Lakewood, Ohio. The hearing will be held, as originally scheduled, in Room 331, Old Post Office Building, Cleveland, Ohio.

Cities Service Protests Panhandle Eastern Rate

WASHINGTON, D. C. — Cities Service Gas Co. has filed a formal protest with the Federal Power Commission, it was revealed here last week, asserting that Panhandle Eastern Pipe Line Co.'s rates are "excessive, unjust and unreasonable and therefore unlawful" and that the petitioner "will suffer pecuniary loss on the gas delivered" under WPB Directive 4B.

According to the Cities Service protest, Directive 4B, ordered Panhandle Eastern to deliver to Cities Service, at the point of interconnection between the facilities of the two companies near Ottawa, Kans., all gas available in excess of the amounts required to supply Panhandle's own loads and to supply Ohio Fuel Gas Co. in accordance with WPB Directive 1. The protest states that gas tendered by Panhandle and received by the protestant for a period from January 2, to January 6, 1943 inclusive and adds that the protestant is advised that gas was available during this period only because of unseasonably warm weather prevailing upon the eastern part of the Panhandle's pipe-line system.

The Ohio Fuel Gas Co. previously filed with the FPC a protest, designated Docket G-432, against the rates charged by Panhandle for natural gas delivered under WPB Directive 1. The rate protested by both Cities Service and Ohio Fuel Gas is 2.5 cents per therm.

New Panhandle Gas Wells Banned by PAW Order 9

WASHINGTON, D. C.—Use of material for the drilling of new natural-gas wells in the Texas Panhandle field was banned February 24 by Petroleum Administrative Order 9.

The order prohibits the use of any materials to drill, complete, or provide additions to any well in any discovered or undiscovered natural-gas field in Carson, Collingsworth, Gray, Hansfield, Hartley, Hutchinson, Moore, Potter, Sherman, or Wheeler counties, Texas.

PAW may issue exceptions to the present ban on the use of materials in the field. Applications to use material to drill, complete, or provide additions to any well must be made by filing a letter in quadruplicate or by sending a telegram to the Director of the Natural Gas and Natural Gasoline Division, Petroleum Administration for War, Interior Building, Washington, D. C., Ref. PAO 9.

Explaining the need for the order, Deputy Petroleum Administrator Ralph K. Davies said:

"Over 1,700 wells now are producing natural gas in the Texas Panhandle field. They are keeping available natural-gas pipe lines loaded to capacity.

"Until an outlet for more gas is available, it will not be in the interest of the war program to use scarce materials for the drilling of wells whose production cannot be made available to consumers because of lack of transportation facilities."

Gremlin Turns Calculation Into Circulation

A typographical error in the story announcing the N.G.A.A. gas measurement standard, February 11 issue, page 78, resulted in the word "calculation" in the method's title being printed "circulation." The correct title of the tentative standard method is N.G.A.A. Tentative Standard Method for Calculation of High Pressure Gas Measurement."

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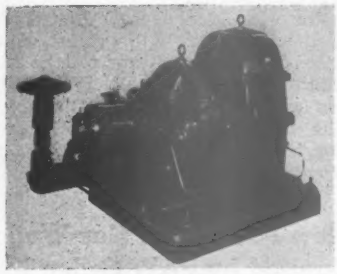

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REFINING

What's Going On At the Plants

Aviation-Gasoline Plant

FRONTIER Refining Co., Cheyenne, Wyo., is building a 100-octane aviation-gasoline plant at its Cheyenne refinery. The refinery has crude capacity of 1,600 bbl. per day and a 520-bbl. cracking unit. R. R. Rankin is refinery superintendent and chief engineer.

Butadiene Plant

FACILITIES for production of butadiene and 100-octane gasoline are under construction at Southport Petroleum Co.'s refinery at Texas City, Tex. V. E. Smith is refinery superintendent. The refinery has crude-oil capacity of 20,000 bbl. daily and includes a 1,200-bbl. cracking plant.

Specialties Emphasized

FACILITIES for the manufacture of synthetic resins and other petroleum specialty products are being expanded at the Exeter Refining Co.'s plant at Long Beach, Calif. The refinery has crude capacity of 10,000 bbl. daily and includes an asphalt unit. N. F. Gallucci is refinery manager; J. A. Campbell is process engineer and John Klein is chief chemist.

High-Octane Units

UNITS for the production of 91-octane gasoline have been completed at the Santa Fe Springs and Hanford, Calif., refineries of the Caminol Co. A depropanizing unit for recovery of butane-butylene fractions is now in operation at the Santa Fe Springs plant which has capacity of 4,000 bbl. of crude daily and a 600-bbl. cracking unit. The Hanford plant's capacity is 3,500 bbl. daily and includes a 1,000-bbl. cracking unit.

Catalytic Facilities Added

TWO HOUDRY units and one Thermofor catalytic cracking plant are under construction at the Beaumont, Tex., refinery of Magnolia Petroleum Co., one of the largest manufacturing units on the Texas Gulf Coast. The Beaumont plant previously included conventional Cross, Houdry and Polyform units. The refinery has crude capacity of 105,000 bbl. daily and cracking facilities for 27,540 bbl. daily. R. R. Jackson is superintendent, T. E. Schley assistant and R. D. Crow night superintendent.

Rebuilt Plant Resumes

OPERATIONS were to have been resumed early this month on the O. C. Field Gasoline Corp. refinery at Casmalia, Calif., a 4,000-bbl. plant which was partially destroyed by fire last October.

Flash Tower Installed

INSTALLATION of a larger flash tower at Aromalene, Inc.'s refinery at Long Beach, Calif., has increased capacity of the plant from 2,100 to 3,000 bbl. daily. J. L. Crawford is president of the company and M. C. Valdes is general manager.

Samuel L. Lubell, president of the Bell Oil & Gas Co., Tulsa, presenting Ben P. Piepgrass, secretary, with a gold pin for his 10 years of service, on the twenty-fifth anniversary of the company. Watching the presentation are Benedict I. Lubell, vice president and general manager, I. A. Anson and M. L. Freese, vice presidents, who also received awards

WPB Cancels Another Quick Butadiene-Conversion Job

WASHINGTON, D. C.—Another refinery-conversion project designed to produce butadiene, chiefly from existing facilities, was cancelled last week when the War Production Board withdrew special priority ratings covering a contract between Defense Plant Corp. and Pan American Refining Corp. at Texas City, Tex.

Previously similar construction projects were revoked at Standard Oil Co. (Indiana) and Standard Oil Co. of Ohio refineries at Wood River and Robinson, Ill., respectively, and with Magnolia Petroleum Co. at Beaumont, Tex.

WPB's revocation order was issued on recommendation of Petroleum Administrator Ickes. Shortages of critical valves, pumps, motors, blowers and other strategic materials are said to be so severe that part of the program for quick butadiene facilities could not be fulfilled in time to contribute to the rubber crisis and, at the same time, is draining certain supplies away from special synthetic-rubber plants.

Pan American's project at Texas City would have cost approximately $1,500,000.

Danube Dismantling Panhandle Refinery

AMARILLO, Tex.—Danube Oil Co. is dismantling its refinery at Borger, Tex. The plant was built several years ago. A modern cracking unit was among plant facilities. Much of the plant's product was sold in bulk to tank wagons.

Farmers Union Purchases Laurel, Mont., Refinery

The Independent Refining Co.'s refinery at Laurel, Mont., has been purchased by the Farmers Union Central Exchange, Inc., subject to the approval of the stockholders.

Purchase price was $750,000 cash, plus inventory value, which probably will increase the consideration to around $1,000,000. The company buys light oil from the Dry Creek field in Montana and some black oil from the Garland-Byron district under contract with the Ohio Oil Co.

The Ohio company, in 1937, built a refinery at Lovell, Wyo., for the purpose of processing its production in the Garland field. The principal output of this refinery is road and fuel oils which are sold in the Minneapolis district. The gasoline tops are sold to the Laurel refinery. It is expected this arrangement will be continued.

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PIPE LINES

Pipe-Line Loads Increase While Earnings Decrease

Volume handled by principal pipe-line companies increased 7.37 per cent in 1942 from 1941 while transportation revenue decreased 2.80 per cent. according to calculations from Interstate Commerce Commission figures.

Total volume in 1942 was 1,602,436,027 bbl., against 1,492,495,976 in 1941, while revenues totaled $226,553,874, against $233,085,128.

Volume increased slightly in the fourth quarter of 1942 from 1941, while transportation revenue declined from the corresponding 1941 period. In the fourth quarter of 1942 total volume was 422,669,598 bbl. against 413,514,033 in the comparable 1941 quarter, an increase of 2.2 per cent.

Total revenue in the fourth quarter of 1942 was $59,910,471, against $60,747,813 in the corresponding 1941 period a decrease of 1.4 per cent.

Not only was pipe-line transporta-

Pipe-Line Operations, Fourth Quarter (October to December) of 1942 and 1941

Name of company—	Transportation revenue (Accounts 501 and 551) 1942	1941	% Inc.	Number of barrels of oil originated on line and received from connections 1942	1941
Ajax Pipe Line Corp.	$1,003,417	$927,645	8.2	7,406,646	6,322,575
American Liberty Pipe Line Co.	41,392	160,581	—74.2	842,404	2,025,321
Arkansas Pipeline Corp.	265,489	101,594	161.3	3,549,295	1,227,727
Atlantic Pipe Line Co.	938,319	1,480,711	—36.6	7,151,377	11,490,292
Bradford Transit Co.	227,343	210,354	8.1	2,298,714	2,126,936
Buckeye Pipe Line Co.	1,491,516	1,357,327	9.9	30,451,357	27,977,163
Buffalo Pipe Line Corp.*	34,078	159,644	—78.7	192,222	879,631
Continental Oil Co.	173,421	315,570	—45.0	2,156,567	3,425,552
Continental Pipe Line Co.	542,033	695,036	—22.0	7,001,072	8,000,846
Empire Pipeline Co.	305,091	299,783	1.8	3,924,735	4,284,306
Eureka Pipe Line Co.	323,521	328,904	—1.6	3,017,732	2,871,022
Great Lakes Pipe Line Co.*	2,345,826	2,093,466	12.1	5,413,968	5,290,426
Gulf Refining Co.	4,868,257	4,847,073	.4	24,302,556	22,325,002
Humble Pipe Line Co.	4,398,439	6,044,837	—27.2	35,713,474	38,764,228
Illinois Pipe Line Co.	3,388,931	3,185,514	6.4	30,190,505	29,156,973
Kaw Pipe Line Co.	469,793	324,742	44.7	8,898,359	6,283,624
Keystone Pipe Line Co.*	724,554	674,947	7.3	4,636,700	4,150,461
Magnolia Pipe Line Co.†	3,494,697	4,340,683	—19.5	22,294,329	24,481,115
National Transit Co.	528,800	512,242	3.2	5,103,624	4,806,056
Oklahoma Pipe Line Co.	862,114	725,805	18.8	10,682,036	10,404,214
Pan American Pipe Line Co.	647,443	654,580	—1.1	7,387,142	6,310,828
Phillips Petroleum Co.*	1,834,330	1,939,534	—5.4	4,744,343	4,337,402
Plantation Pipe Line Co.‡	2,484,809	.....	....	5,621,377	.....
Portland Pipe Line Co.‡	577,064	151,721	280.3	2,896,568	1,167,087
Pure Transportation Co.	756,618	814,176	—7.1	8,072,291	8,608,978
Rocky Mountain Pipe Line Co.	218,562	247,722	—11.8	976,174	959,504
Shell Pipe Line Corp.	3,579,801	3,693,319	—3.1	14,309,557	15,005,462
Sinclair Refining Co.	5,484,746	5,180,019	5.9	21,899,789	20,999,793
Socony-Vacuum Oil Co., Inc.: White Eagle Pipe Line Division	293,022	261,531	12.0	6,956,882	4,530,746
Sohio Pipe Line Co.	1,982,913	2,232,518	—11.2	20,495,083	21,508,541
South West Pennsylvania Pipe Lines	202,699	185,273	9.4	3,753,994	3,475,938
Standard Oil Co. of Louisiana	1,856,485	1,641,673	13.1	16,587,676	14,128,166
Standish Pipe Line Co.	583,511	901,851	—35.3	10,846,953	10,500,461
Stanolind Pipe Line Co.	5,484,050	5,934,738	—7.6	22,743,409	19,945,823
Susquehanna Pipe Line Co.*	341,003	447,123	—23.7	3,685,528	4,259,748
Texas-Empire Pipe Line Co.	2,382,267	1,578,831	50.9	11,040,688	10,049,409
Texas-Empire Pipe Line Co. of Texas§	76,230	381,170	....	1,474,639	3,818,480
Texas-New Mexico Pipe Line Co.¶	1,004,500	1,474,529	—31.9	5,581,430	6,788,524
Texas Pipe Line Co.¶	2,582,626	2,958,478	—12.7	25,115,814	28,271,359
Tidal Pipe Line Co.	186,171	210,435	—11.5	4,351,982	4,316,017
Tide-Water Pipe Co., Ltd.	168,280	203,423	—17.3	1,701,118	1,602,924
Transit & Storage Co.	193,188	192,330	.4	2,756,235	2,393,711
Tuscarora Oil Co., Ltd.	166,847	220,144	—24.2	3,571,266	3,417,951
Utah Oil Refining Co.	396,275	456,237	—13.1	871,988	823,711
Total	$59,910,471	$60,747,813	—1.4	422,669,598	413,514,033

*Company engaged primarily in handling refined petroleum.

†Figures for 1941 include returns of Socony-Vacuum Oil Co., Inc., Midland Pipe Line Division, which was consolidated with Magnolia Pipe Line Co. effective July 1, 1942.

‡Operations commenced as follows: Plantation Pipe Line Co.—January 1942; Portland Pipe Line Co.—November 1941.

§Operations discontinued November 30, 1942.

¶Number of barrels of oil is total delivered out of system.

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WHEATLEY PUMPS and VALVES
TULSA OKLAHOMA

tion of gasoline far larger in 1942 than in 1941, but December also recorded an increase over the corresponding month a year earlier. However, December shipments decreased from a month earlier.

WEP Increases Rate of Tank-Car Loadings

Loading of tank cars at the War Emergency Pipelines, Inc., terminal of the 24-in. pipe line at Norris City, Ill., has been increased to a rate of 80,000 to 100,000 bbl. daily. The movement of oil from Norris City has been somewhat restricted by slowness in sending tank cars to this terminal because of a reluctance of some buyers to accept crude oil with the present water content, the result of mixing oil and water at low places where it was necessary to load the line with water during construction in order to hold it down. Some chemical treatment is required for emulsions but most of the water settles out. Movement of oil from Norris City by pipe line will be delayed until the water content is less than 1 per cent. As operation of the line continues water at the low spots will be swept out.

Tank cars are being loaded from one loading rack which can only function during daylight because installation of lighting facilities has been delayed. Two additional racks are being pushed to completion as fast as equipment arrives. One rack is sufficient for loading all cars arriving at the current rate. Each of the three racks can load 100 cars at a "spotting." Two 80,000-bbl. tanks have been installed; 15 tanks are required for the terminal.

No heating oil will be put into the line at Longview. Tex., until the end of March.

Six stations on the line are now being operated intermittently. However, two stations are capable of handling the present load. On the receipt of small parts, "even numbered" stations on the Texas-Illinois leg will be completed.

On the construction of the Norris City, Ill.,-East Coast extension there has been a marked increase in laying operations during the past week in spite of adverse weather conditions. More than 105 miles of pipe had been laid for the extension at the beginning of this week.

Defense Plant Buys Houston Gulf Line

Defense Plant Corp. agreed last week to purchase at a cost of about $2,625,000 a natural-gas transmission line owned by the Houston Gulf Gas Co. extending 145 miles from Refugio to Pierce Junction in Texas.

The purchase was recommended by the Petroleum Administration for War. The line will connect oil pipe lines between Corpus Christi and Longview, Tex. It will be used to supply Gulf Coast refiners deprived of sweet East Texas crude oil by the construction of the 24-in. pipe line from Longview to Norris City, Ill., and the New York-Philadelphia area. Houston Gulf Gas Co. is affiliated with United Gas Pipe Line Co.

ICC Sets Valuation Of Socony Lines

The Interstate Commerce Commission last week fixed the final valuation of the oil pipe lines owned and used by Socony-Vacuum Oil Co., Inc.

The lines owned by the company were valued at $5,125,000 and those used by it at $5,149,133. The lines used by the company under lease are owned by National Transit Co., New York Transit Co., Northern Pipe Line Co., Duke Producing Co. and private parties.

The Socony-Vacuum system includes a total of 432.78 miles of line, composed of 395.65 miles of trunk line and 37.12 miles of gathering lines. It is divided in two divisions—the midland division, which includes the lines in Illinois, Indiana and Ohio operated for Socony by the Magnolia Petroleum Co., and the New York and Pennsylvania lines.

ICC notified Socony and state governors and regulatory bodies.

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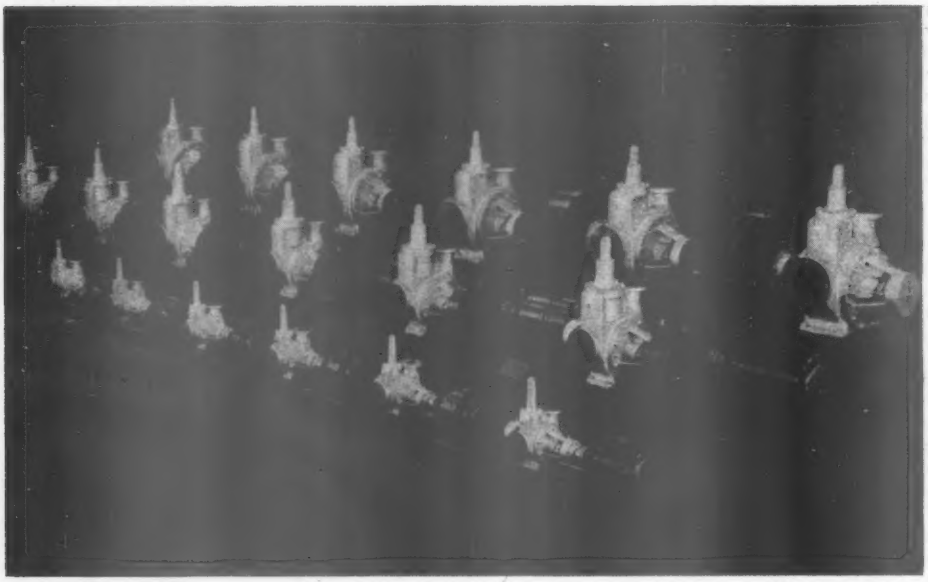

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Exploration and Drilling

Reserve Estimates

REFLECTING the interest in estimates of reserves, the American Petroleum Institute's committee on reserves has published its report much earlier than usual this year. Since only a month has elapsed since The Oil and Gas Journal's estimate was published and since, during this month, PAW has also issued an estimate of new reserves found, it is only natural to expect that these three estimates will be closely scrutinized and compared. Newspaper reports have already appeared which stress the differences between them and these presumably reflect the opinions of a number of oil men. The feeling is that if the estimates vary widely, little reliance can be placed on them.

Actually, the bases on which the estimates are made differ slightly and this fact has caused much of the confusion. On analysis, it is found that the three estimates are strikingly in accord. Take for example the estimated total proven reserves as of January 1, 1943. The A.P.I. total is 20,082,793,000 bbl. and The Oil and Gas Journal total is 20,675,899,000 bbl., or 593,106,000 bbl. more than the A.P.I. estimate. This may seem a large quantity but it represents less than 3 per cent of the total.

As of January 1, 1942, the A.P.I. estimated proven reserves stood at 19,589,296,000 bbl. and The Oil and Gas Journal's figure was 20,299,543,000 bbl., or 710,247,000 bbl. more than the A.P.I. estimate. This represents about 3.5 per cent variation between the two estimates.

Taking 1942 production into consideration, the A.P.I. added a total of 1,878,976,000 bbl. through discoveries, extensions and revisions of previous estimates and The Oil and Gas Journal added 1,760,884,000 bbl., a difference of less than 6 per cent. This is the widest variation noted in the national totals and can be explained easily. The Oil and Gas Journal's revisions for certain fields anticipated the A.P.I. revision. This tendency has appeared in previous years, with the result that The Journal's estimates were farthest from those of the A.P.I. in 1939 and the two have been drawing closer together since. The fact that two estimates, prepared without the slightest collaboration, are in such close agreement indicates that the inventories of recoverable oil prepared by each stand on pretty firm ground.

Every year estimates of reserves are revised and this revision is generally upward in the different states and is invariably upward for the national total. This revision indicates conservatism in original estimates as well as the fact that technological improvements in production methods increase the amount of oil recoverable from the fields in which they are applied. This revision, however, does not imply much, if any, increase in the oil immediately recoverable. It merely means that the life of the fields has been extended. The new oil reported in the revisions thus tends to be oil which will be produced later under relatively high cost.

If the demand becomes greater than the supply available under present methods and it is necessary to overproduce the nation's fields, this will necessitate another revision of reserve estimates which will be downward rather than upward.

In recent years, The Oil and Gas Journal has published its revision of estimates of old fields in the Annual Number but did not do so this year. As a result, the amount of oil added through discoveries and extensions has generally been taken as the total estimated additions to reserves. The actual figures are as follows:

	Barrels
Total reported January 1, 1942	20,299,543,000
Revised estimate, January 1, 1942*	21,219,039,000
Added through revisions	919,496,000
Added by extensions	518,580,000
Added by discoveries (new fields and pays)	322,808,000
Total added	1,760,884,000

*Revision made as of Jan. 1, 1943.

With regard to individual states,

COMPLETIONS IN ALL FIELDS . . .

(Week Ended February 27, 1943)

	Oil	Gas	Dry	Total	Footage	Comp. to date 1943	Comp. to date 1942
N. Y., Pa., and W. Va.	48	9	0	57	164,733	455	642
Ohio	3	6	4	13	38,538	107	165
Indiana	3	0	6	9	17,896	43	55
Kentucky	1	2	0	3	7,029	35	46
Illinois	28	1	11	41	96,821	281	330
Michigan	3	0	4	7	18,489	60	121
Kansas	16	0	10	26	80,921	202	275
Nebraska	0	0	0	0	0	3	7
Missouri, Iowa	0	0	0	0	0	2	2
Oklahoma	8	3	9	20	50,489	170	255
Texas:							
North Central Texas	7	3	10	20	49,497	173	270
West Texas	18	0	7	25	102,829	137	334
Texas Panhandle	1	0	2	3	9,358	31	112
Eastern Texas	4	0	1	5	30,908	39	86
Texas Gulf Coast	4	2	3	9	54,775	60	147
Southwest Texas	7	0	10	17	137,971	130	230
Total Texas	41	5	33	79	385,338	570	1,179
North Louisiana	5	0	2	7	28,295	47	105
Louisiana Gulf Coast	0	0	3	3	28,911	52	108
Total Louisiana	5	0	5	10	57,206	99	213
Arkansas	2	0	5	7	32,416	31	22
Mississippi and Southeast	0	0	0	0	0	4	12
Montana	1	0	1	2	4,886	22	27
Wyoming	1	0	0	1	4,055	20	12
Colorado, Utah	0	0	0	0	0	1	2
New Mexico	2	0	0	2	6,719	29	44
California	21	0	3	24	70,006	152	173
Total United States	184	26	91	301	1,035,542	2,286	3,583
Total previous week	152	21	87	260			
Week ended Feb. 28, 1942	193	28	103	314			

there is greater variation between the two estimates. A possible reason for this is obvious. A.P.I. estimates are made by different committees whose definition of the word "proven" may vary. That does not mean that one set of estimates is superior to another as this variation in definition on the part of A.P.I. local committees may be offset by other variations in The Journal's methods of estimating reserves. It may be significant that the A.P.I. estimate of reserves in California are only 0.5 per cent greater than those of The Journal. In Texas the difference is less than 2 per cent. These states have many fields and all stages of production from new flush fields to stripper areas. The A.P.I. estimates are higher than those of The Journal in New Mexico and Louisiana, suggesting that the local committees include more structural considerations than The Journal does. In Oklahoma, Kansas, Illinois, Michigan and Pennsylvania, The Journal's estimates are higher than those of the A.P.I. indicating that its rating of settled production forecasts greater longevity than do the A.P.I. estimates.

Estimates of oil found in new fields in 1942 should normally be expected to show wider variation. Less is known of these new fields at the time the estimates are made than of any others. In The Oil and Gas Journal of February 11, the PAW estimate was compared with that of The Journal and the two were found to be in rather close agreement if the different bases used by the PAW for their three estimates are considered. At the New York meeting of the A.I.M.E., E. DeGolyer estimated newly discovered reserves to be 317,000,000 bbl. which is higher than The Journal's estimate as it excludes new sands. The A.P.I. estimate is somewhat less and also covers new pools only. The Journal's estimates include discoveries in new sands in older pools. A direct comparison of the two estimates follows:

TABLE 1—DISCOVERIES IN 1942

(In thousands of barrels)

State—	The Journal (new pools and new sands)	A.P.I. (new pools)
Arkansas	21,880	19,706
California	12,850	5,195
Colorado	None	None
Illinois	37,986	14,281
Indiana	1,775	780
Kansas	15,600	14,719
Kentucky	3,000	2,675
Louisiana	54,050	42,110
Michigan	3,585	6,120
Mississippi	120	None
Montana	200	200
Nebraska	None	None
New Mexico	21,760	16,340
Ohio	1,380	1,160
Oklahoma	48,860	26,897
Pennsylvania	None	None
Texas	95,980	105,653
West Virginia	None	None
Wyoming	3,800	1,200
Miscellaneous	15	In others
Total	322,808	260,051

As the A.P.I. does not give detailed estimates by fields, it is impossible to reconcile these two estimates exactly. However, an approximation may be made. If, in California, the A.P.I. considered Antelope Plains to be an extension to Midway-Sunset, the two estimates agree closely. In Illinois, a large proportion of the discoveries listed by the Journal were new sands, rather than new fields. The inclusion of structural considerations in addition to actual drilling would give the A.P.I. a higher figure for Louisiana. In Oklahoma, The Journal apparently rates the Pauls Valley field higher than the A.P.I.

The difference of some 20 per cent between the two estimates, therefore, reflects the different bases on which they were prepared as well as a difference of opinion regarding the potentialities of certain new fields. Both estimates are made with the certainty that they do not include all of the oil that will be recovered from these fields and both sets will undoubtedly be revised upwards as additional development discloses new facts.

DAILY AVERAGE PRODUCTION FOR WEEK

	Feb. 27 crude oil	Feb. PAW quota all oils	Feb. 20 crude oil
Arkansas	75,100	78,700	75,300
California	760,450	823,700	780,250
Colorado	6,000	7,000	6,075
Eastern fields	83,000	114,600	94,500
Illinois	242,500	272,200	245,500
Indiana	15,800	17,200	16,000
Kansas	306,400	310,500	316,650
Louisiana	336,350	349,800	337,250
North Louisiana	*89,800*	.....	*90,700*
Louisiana Gulf Coast	*246,550*	.....	*246,550*
Michigan	57,500	63,700	58,600
Mississippi	53,300	50,000	55,000
Montana	22,875	24,700	19,090
Nebraska	2,300	3,000	2,300
New Mexico	105,100	105,800	105,110
Oklahoma	350,450	395,300	347,700
Texas	1,351,450	1,452,000	1,343,000
East Texas	*325,100*	.....	*325,100*
West Texas	*213,900*	.....	*213,900*
North Central Texas	*135,350*	.....	*135,350*
East Central Texas	*102,250*	.....	*100,000*
Texas Panhandle	*83,900*	.....	*83,900*
Texas Gulf Coast	*420,450*	.....	*414,250*
Southwest Texas	*65,500*	.....	*65,000*
Wyoming	91,500	94,100	91,800
Total United States	3,860,075	4,162,300	3,894,125
Total production Jan. 1-Feb. 27, 1943		223,832,965 bbl.	
Same period last year		238,946,405 bbl.	

Week's Highlights

NORTH TEXAS: A new Caddo lime pool has been opened in western Jack County while a gas and distillate pool is in prospect in the southeastern part of the county. A new oil pool is in the offing in northeast Archer County where a well is bailing oil from the Bend conglomerate (p. 76).

CALIFORNIA: A Miocene sand field has been discovered in an area of Ventura County where many dry holes have been drilled and a well in the Cat Canyon area has been plugged back to test a heavy showing of oil recently encountered (p. 74).

SOUTHWEST TEXAS: Oil showings encountered in a western Starr County wildcat afford prospects of a new oil field and a test southeast of the Oakville field, Live Oak County, is reported to have found a new shallow sand (p. 80).

PERMIAN BASIN: A wildcat in northeast Runnels County, previously reported dry, has been plugged back and is pumping oil from the Swastika sand to open a new producing area for the county (p. 71).

OKLAHOMA: The East Watchorn pool of Pawnee County has been extended into Osage County and a rapid expansion of the pool in that county is anticipated. A wildcat in the old Konawa area of Seminole County has opened a new field from the Booch sand and an extension well on the southwest side of the Cement field, Caddo County, is reported to have recovered nearly 100 ft. of saturated sand (p. 85).

OHIO: A wildcat 2 miles north of the nearest producer in the Sandyville field has been completed as a large gas well. The Wellington and Wheeling pools have each been extended approximately ½ mile (p. 83).

KANSAS: A stratigraphic test in Decatur County is reported to have encountered showings of oil and water and a well midway between the Lindsborg and Southwest Lindsborg fields has been completed to join the two areas into one large field (p. 83).

PERMIAN BASIN, PANHANDLE

New Producing Area Opened In Northeast Runnels County

MIDLAND, Tex.—Pawnee Royalty Co. 1 L. A. David, Section 330, Block 64, F. J. Ford Survey, northeast Runnels County wildcat, reported dry at 4,735 ft., plugged back and perforated casing from 2,464-66 ft. and pumped 91.25 bbl. 45-gravity oil from the Swastika sand to open a new producing area in the county. The well is 6 miles northeast of the McMillan pool, and 2½ miles southeast of Winters. A slight show of oil and gas had been reported from Ellenburger at 3,730-35 ft., and also a show from 2,464-72 ft.

In Concho County, B. A. Duffy 1 Robert Wilson, 1 mile northwest of Floyd Dodson 1 Wilson which opened the area late in 1941, made a small head of oil after being shot with 340 qt. from 3,718-3,863 ft. The well was drilled to 3,897 ft. and plugged back to 3,865 ft. The test is located in NW NW Section 76, Block 8, H.&T.C. Survey, and has an elevation of 2,309 ft.

In Crockett County, John I. Moore and P. D. Moore 1-12 Shannon, NW NW Section 12, Block FF, John Small Survey, northeast of the lone producer in the Live Oak pool, indicated a new shallow field when oil rose 1,200 ft. in the hole from 2,385 ft. in lime. Operators reportedly swabbed 30 bbl. of oil, lowering the fluid to 240 ft. of bottom and continued drilling operations. Last depth reported was 2,394 ft.

The Fullerton pool of Andrews County was assured a good well on the south when Fullerton Oil Co. 1-A Wilson flowed at the rate of 16 bbl. per hour after two-stage acid treatment of 2,000 gal. and 6,000 gal. in pay in the upper part of the Clear Fork horizon. Additional hole will be cut before the well is finally completed. The Embar pool of southern Andrews County received its fourth producer when Phillips Petroleum Co. 32 University-Andrews flowed 130 bbl. in 5½ hours after acid treatment of the Clear Fork lime from total depth 6,250 ft. DeKalb Agricultural Association 1 Means, wildcat 3½ miles southwest of Means pool production, was preparing to drill deeper after tests in the lime zone 4,838-85 ft. showed salt water.

First dry hole for the deep Barnhart pool of southeast Reagan County was registered last week. It was Amerada 1-M University, NW NE Section 48, University Survey, the thirteenth well drilled by Amerada in the field. It went to 9,394 ft. and limits the producing area on the west.

In Pecos County, Magnolia 1-29 Eaton, topped Tulip Creek at 6,710 ft. and was drilling ahead after coring from 6,961-71 ft. Standard Oil Co. of Texas 1 Douglas Oil-Smith, deep test on the west flank of the Yates pool, had progressed to 5,300 ft. in lime. Failure for the southeast edge of the Abell pool was Humble 2 T. R. Parker, which was abandoned at 5,900 ft. Another Pecos County wildcat completed dry last week was Superior Oil Corp. 1 Cordova Union, east outpost to the Apco-Warner pool, which went into granite without logging Ellenburger. Total depth is 4,962 ft.

Gulf Oil Corp. 1 Estes, western Crane County deep project, cemented 7-in. casing between 7,580-90 ft. to test a saturated section encountered at 7,615 ft., total depth. Extent of the show was not revealed.

Most important wildcat location for the week was in Ward County, where Phillips Petroleum Co. will drill 1-B University, NW NW Section 28, Block 16, University Land, to a depth of 6,500 ft.

In northwest Mitchell County, W. S. Guthrie will drill 1 R. I. Solomon, SW SE Section 71, Block 97, H.&T.C. Survey to 3,500 ft. with cable tools. An outpost to the one-well Heiner pool in Pecos County, which is producing from the Ellenburger, is Culbertson & Irwin 1 Heiner, NE SW Section 589, G.C.&S.F. Survey, ¾ mile southwest of the discovery.

WEST TEXAS COMPLETIONS

Wildcats

Edwards County: Dan Auld 1 F. L. Hinking, SW NW Sec. 63, Blk. E, H.E.&W.T. R.R. Sur., dry, T.D. 4,045 ft.

Kimble County: Ben Banner 1 Frank Baker, 3,295 ft. S, 330 ft. E of NE cor. Sec. 443, Blk. B, Underwood Sur. A-709, elev. 1,760 ft., dry, T.D. 1,790 ft.

Pecos County: Anderson-Prichard 1-A M. I. Masterson, SW SW Sec. 24, Blk. 140, T.&St.L. Sur., elev. 2,553 ft., blew est. 40,000,000 cu. ft. gas from 4,195 ft., exhausted, dry, T.D. 4,565 ft. in granite.

Superior Oil Corp. 1 Cordova Union, 467 ft. from SW and E lines, Sec. 3, Pink Phelps Sur., elev. 2,517 ft., Yates 1,517 ft., no Ellenburger, granite 4,860 ft., dry, T.D. 4,862 ft.

Runnels County: Pawnee Royalty 1 L. A. Davis, NW NE Sec. 330, Blk. 64, F. J. Ford Sur., reported dry at 2,735 ft., D.D. to 4,735 ft., P.B. 2,466 ft., perf. 20 shots, pumped 91 bbl. from Swastika sand, T.D. 4,735 ft. in Ellenburger, discovery.

Fields

Abell Permian, Pecos County: Stanolind and Talvez 2 Ellis A. Hall, 330 ft. from E, 831 ft. from SW, Sec. 18, Blk. 2, H.&T.C.R.R. Sur., pumped 200 bbl., pay 2,296 ft., T.D. 2,306 ft.

Humble 2 T. R. Parker, 530 ft. from NE, 1,972 ft. from NW Sec. 6, Blk. 3, H.&T.C. Sur., elev. 2,396 ft., McKee sand 5,360 ft., Tulip Creek 4,990 ft., dry, T.D. 5,900 ft., lime.

Barnhart, Reagan County: Amerada 1-RM University, NE NW Sec. 6, Blk. 48, Univ. Sur., elev. 2,777 ft., dry, T.D. 9,394 ft.

Estes, Ward County: Texas Co. 6-C University, SW SE Sec. 5, Blk. 16, Univ. Sur., flowed 436 bbl., pay 2,475 ft., T.D. 2,675 ft., lime.

Foster, Ector County: Sunray Oil 5 J. E. Bagley, NW NW SE Sec. 17, Blk. 42, Twp. 2s, T.&P. Sur., flowed 599 bbl., 33.8 gravity, pay 4,220 ft., shot 410 qt., T.D. 4,385 ft., lime.

Mascho, Andrews County: Whitaker Oil 1-A University, NW SE Sec. 23, Blk. 10, Univ. Sur., elev. 3,200 ft., pumped 131 bbl., 31 gravity, pay 4,470 ft., T.D. 4,550 ft., lime.

Sand Hills, Crane County: Magnolia 19 P. J. Lea, NE NW Sec. 16, Blk. 32, D.S.L. Sur., flowed 227 bbl., 23.8 gravity, pay 4,400 ft., lime, T.D. 4,659 ft.

Shipley, Ward County: James H. Snowden 9-A Wristen Bros., W¼ S¼ E¼ Sec. 18, Blk. 5, H.&T.C. Sur., elev. 2,498 ft., flowed 208 bbl., 35 gravity, pay 2,458 ft., T.D. 2,494 ft.

South Shipley, Ward County: Cross 1 C. L. Monroe, E¼ E¼ E¼ Sec. 5, Blk. 5, H.&T.C. Sur., elev. 2,479 ft., dry, T.D. 2,427 ft., lime.

Slaughter, Cochran County: Devonian 16-B Duggan, SE cor. Lbr. 19, Lge. 55, Oldham County School Land, elev. 3,688 ft., flowed 1,050 bbl., pay 5,031 ft., lime, acid 12,000 gal., T.D. 5,068 ft.

Devonian 22-A Duggan, SW cor., Lbr. 11, Lge. 55, Oldham County School Land, flowed 1,305 bbl., pay 5,014 ft., lime, acid, T.D. 5,046 ft.

Bay Pet. 4 Mallett, NE cor. Lbr. 20, Lge. 53, Scurry County School Land, elev. 3,638 ft., flowed 226 bbl. bbl., pay 5,005 ft., lime, acid, T.D. 5,026 ft.

Slaughter, Hockley County: L. M. Glasco 6-C Mallett, SW cor. Lbr. 17, Lge. 48, Edwards County School Land, elev. 3,613 ft., flowed 596 bbl. 32.5-gravity, pay 4,910 ft., lime, acid, T.D. 4,959 ft.

T. F. Morrow 22 Mallett, SE cor. Lbr. 18, Lge. 48, Edwards County School Land, flowed 775 bbl., pay 4,895 ft., lime, acid, T.D. 4,957 ft.

Taylor Link, Pecos County: H. G. Eastman, Jr., 5-B University, NW SW SW Sec. 12, Blk. 18, Univ. Sur., pumped 245 bbl., 20 per cent water, pay 1,613 ft., lime, acid 2,000 gal., T.D. 1,640 ft.

Wasson, Yoakum County: Belfort Oil 5 J. T. Herd, NW NE Sec. 795, Blk. D, J. H. Gibson Sur., elev. 3,664 ft., pumped 144 bbl., 32.2 gravity, pay 5,050 ft., shot 270 qt., T.D. 5,145 ft., lime.

DeKalb Agricultural Assn. 2 Annie Armstrong, NW NE Sec. 889, Blk. D, J. H. Gibson Sur., flowed 776 bbl., pay 5,001 ft., lime, T.D. 5,110 ft.

Drilling & Exploration 4-A A. J. Davis, NE SE Sec. 728, Blk. D, J. H. Gibson Sur., elev. 3,631 ft., pumped 154 bbl., pay 5,015 ft., lime, T.D. 5,245 ft.

World, Crockett County: Trebol Oil 2 E. L. Powell, E½ SE NE Sec. 53, Blk. BB, E.L.&R.R. Sur., pumped 171 bbl., pay 2,570 ft., lime, T.D. 2,608 ft.

White & Baker, Pecos County: Cardinal Oil 4-L White & Baker, SE SE NE Sec. 90, Blk. 194, G.C.&S.F. Sur., flowed 92 bbl., 32 gravity, pay 1,963 ft., lime, T.D. 1,983 ft.

TEXAS PANHANDLE

AMARILLO, Tex.—Drilling in the Panhandle field is due for a slackening in observance of the new ruling handed down by the petroleum administrator last week. No more gas

(Continued on Page 92)

EASTERN TEXAS FIELDS

Quitman Field Wells Record Large Flows From Paluxy

DALLAS, Tex. — Two good wells were completed in the Quitman pool of Wood County last week. Shell Oil Co., Inc. 1 Blalock, north offset to the discovery, flowed 691.2 bbl. of 43-gravity oil through ¼-in. choke from Paluxy sand 6,316-50 ft., and an east offset to the discovery, Delta Drilling et al 1 Blalock, flowed at the rate of 840 bbl. per day on ¼-in. choke from same pay at 6,264-6,350 ft. Delta and Shell 1 Goldsmith-Blalock, west offset to the discovery, was running electric survey to a total depth of 6,403 ft. A 20-ft. core recovered from 6,385-6,403 ft. showed 4 ft. of oil sand, 4 ft. of fine sand showing heavy asphalt, 3 ft. of white sand with oil stains, and 9 ft. of water sand. Shell 2 Goldsmith was coring below 6,210 ft., and was believed to be the highest well in the field to date. Shell has moved rig to 3 Goldsmith, south of the No. 2 well.

Carter-Gregg Oil Co. 1 Steward, James Ames Survey, 5 miles north of Fairfield in Freestone County, showed gas, oil and water on test of the Woodbine sand from 3,978 to 4,027 ft., and another test is to be taken. Total depth is 4,048 ft.

Plans to drill a 6,500-ft. Paluxy sand test in Van Zandt County, 3 miles northwest of Grand Saline, have been completed, and the test will start by April 1. It will be Beckett & Torrans 1 Smith, Fowler Survey. A. F. Carter 1 Hazel, H. C. Marrs Survey, 1 mile north of Fruitvale, was drilling below 6,300 ft. after straightening hole at 4,900 ft. Royal Petroleum Co. 1 Key, William Wills Survey, 2½ miles southeast of Wills Point, had progressed to 3,500 ft. in sand and shale.

A new wildcat was staked in southwestern Anderson County by Byrd-Frost, Inc., as 1 C. L. Marsh, J. E. Box Survey, between Long Lake and Elkhart. The Texas Co. 2 Greenwood, in the Keechi dome area of central Anderson County, will be a Woodbine test. Surface casing has been set.

Heavy rig has been moved to Wyckliffe 1 Hackett, Samuel Leeper Survey, 1½ miles north of Sand Flat in Smith County, and the test will resume operations after having been shut down several months curing titles. It is scheduled to go to 9,700 ft.

Rains County gained a new wildcat at American Liberty Oil Co. 1 Republic Insurance Co., Henry Howell Survey, 2 miles east of Alby and 5 miles northwest of Alba, which will go to 6,500 ft. into the Paluxy zone.

P. D. Bowlen 1 Simms, Bowie County, was nearing contract depth after logging top of the Smackover at 8,868 ft. Contract is 100 ft. into the Smackover, and last reported depth was 8,910 ft.

In Marion County Gulf Oil Corp. is planning a 9,200-ft. Smackover lime test near Mims Chapel.

Derrick is erected at Amerada 1 Turner, 9,200-ft. Smackover test on the east side of the Coke pool in northern Wood County, and 5 miles southwest Bobby Manziel has spudded his 1 Bailey in the Burch Survey.

EAST TEXAS COMPLETIONS

Wildcats

Shelby County: Humble 1 J. T. Harris, R. C. Farmer Sur. A-942, 660 ft. S, 610 E of NE cor. J. M. Hooper Sur., Eagleford, 3,760-70 ft., showed porosity in Rodessa lime, stuck drill pipe, junked at T.D. 6,803 ft.

Fields

Coke, Wood County: Amerada 2 G. A. McCreigh, 2,037 ft. from E, 8,275 ft. from S, M. Y'Barbo Sur., elev. 486 ft., flowed 222 bbl., perf. 6,300-32 ft. sand, T.D. 6,336 ft.

Quitman, Wood County: Shell 1 Blalock, 663 ft. from S, 660 ft. from E, 67.5-acre tract, S. G. Purse Sur., elev. 459 ft., flowed 691.2 bbl., perf. 6,316-50 ft., Paluxy sand, T.D. 6,498 ft.

Delta Drilling 1 J. A. Blalock, 660 ft. from S, midway between E and W lines 95-acre tract, S. G. Purse Sur., elev. 462 ft., flowed 840 bbl., ¼-in. choke, perf. 6,264-6,350 ft., sand, T.D. 6,394 ft.

Hawkins, Wood County: Humble 1-B Shamburger, 1,750 ft. from E, 1,825 ft. from N, James Pollock Sur., elev. 427 ft., flowed 435 bbl., perf. 4,749-4,870 ft., T.D. 4,877 ft.

LOUISIANA GULF COAST

Mechanical Trouble Delays Work At St. Landry Parish Prospect

NEW ORLEANS, La.—Mechanical trouble has interrupted work on Sun Oil Co. 1 A. T. Burleigh, in the Shuteston area of St. Landry Parish, which is hoped to open the third new field in coastal Louisiana for 1943. At latest reports the crew was fishing for drilling equipment. The well has been bottomed at 11,753 ft. Tests are reported to have afforded encouragement.

American Republics Corp. 1-X Lutcher-Moore Lumber Co., 3-6s-13w, Beauregard Parish, was close to 12,200 ft. and drilling ahead. The operators, it is understood, will carry this exploratory test, already the deepest active wildcat on the Louisiana Gulf Coast, to whatever levels can be reached. The hole already is much below normal producing zones in the territory. It is north of production in the Bancroft field.

Work of cleaning out Union Sulphur Co. 1 J. P. Gueno, in the Branch area of Acadia Parish, is being continued. About 1,500 ft. of drill pipe was lost in the hole when a blowout and fire halted operations last October. In a sister well, 2 Gueno, drilled as a relief hole, mud was being circulated and conditioned. Both wells were being kept full of mud from No. 2.

Union Oil Co. of California has completed as a gas well its 1-C Louisiana Furs, Inc., T-16s-2e, Vermilion Parish. Total depth is 11,985 ft. The hole cleaned to 11,135 ft. It has been shut in awaiting gage.

Gulf Refining Co. 3 Delta Securities Co., in the new Bully Camp field of La Fourche Parish, was at 6,595 ft. in sidetracked hole, with tests showing no evidence of oil or gas.

Superior Oil Co. was cutting and pulling stuck drill stem at 3,800 ft. in its 2 La Terre Oil Co., in the Lake de Cade area of Terrebonne Parish.

LOUISIANA GULF COAST COMPLETIONS

Wildcat

Orleans Parish: W. T. Burton 9 State, Lake-11s-14e, location abandoned (permit expired).

Fields

Charenton, St. Mary Parish: Fifteen Oil Co. 3 South Coast Corp., 31-13s-10e, dry at 6,825 ft.

Kenilworth, St. Bernard Parish: Vendome Petroleum Co. 4 Kenilworth Plantation, 58-13s-14e, dry at 10,671 ft.

La Fourche Crossing, La Fourche Parish: Milton Oil Co. 2 Martinez, 132-15s-17e, O.W.W.O., old T.D. 11,000 ft., old P.B. T.D. 10,127 ft., squeezed and perf. 9,620-35 ft, 49 bbl. distillate and 6,360,000 cu. ft. gas through 18/64-in. choke, T.P. 3,450 lb., gas-oil ratio 29,795.

Little Bayou, Iberia Parish: Texas 22 J. P. Duhe, 26-12s-7e, dry at 11,415 ft.

Ville Platte, Evangeline Parish: Continental 1 Adam Tate Unit 37, 43-4s-2e, O.W.W.O., old T.D. 10,186 ft., cleaned hole to 10,153 ft., set retainer at 10,130 ft., squeezed,

(Continued on Page 76)

a Jap's-eye-view of a

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CALIFORNIA

Ventura County Wildcat Flows Oil From Miocene Sand

LOS ANGELES, Calif.—R. S. Lytle, operating for the Doheny interests, has apparently discovered a new commercial oil pool on the Elkins property in the east central part of 6-3n-19w in Ventura County. This wildcat is in an area where numerous failures were drilled during the past 20 years. Lytle's discovery is northeast of the Bardsdale field and about 2 miles west of the northern tip of the Shiells Canyon field, the latter a good pool and the former one of the state's oldest fields.

The discovery well was brought in flowing 119 bbl. of 29.1-gravity oil cutting 3 per cent daily from a Miocene oil sand cored at 4,800-4,975 ft. Sand trouble delayed completion for several weeks and it may be another several days before regular production is under way. Production is through a 10/64-in. bean and pressures are about 100 to 300 lb. The well was drilled to 5,681 ft. but was plugged back to 4,919 ft. prior to completion and a string of 9¾-in. casing cemented at 4,808 ft. It will probably take another well or two to definitely determine the real significance of this discovery although there is no question that Lytle has found a commercial accumulation. The Miocene oil sand found in this well was just below a fault zone which may or may not influence the accumulation in other sections of the field.

Lytle's new well shows some similarly to Continental's recent discovery on Ramona anticline in the Piru district of Ventura County inasmuch as both started off with a rather small initial. Continental's Ramona well, however, did not flow. A second well now being drilled by Continental Oil Co. on the Ramona anticline is in the pay but at 4,525 ft. is showing 60° dips. This anticline is very sharp and is generally termed the jack-knife anticline. The discovery well, which also reflected sharp dips, was carried to 5,228 ft. but later plugged back to 4,663 ft. from which depth it was brought in pumping 82 bbl. of 23-gravity oil daily. Top of the Miocene oil sand was cored in this well at 4,105 ft. and bottom of the pay was logged at 4,663 ft. It remains to be seen whether either or both of these fields prove to be of primary importance from a production standpoint.

On the east side of the Ventura field, Lloyd Corp. last week completed an excellent flowing well when 9 Lloyd, on fee-owned acreage, was completed at a daily rate of 1,100 bbl. of clean 33.5-gravity oil. This well is on property that Lloyd had previously leased to Shell Oil Co. and Tide Water Associated Oil Co., but which had been returned to him when both drilled small wells. Lloyd, believing that the property would be productive in the lower Lloyd zones, undertook development for himself. Nine flowing wells have been completed to date.

In the Cat Canyon area, Standard Oil Co. is preparing to make a production test of 1 South Basin-Lloyd, which had been carried to 7,250 ft. and then plugged back to 4,704 ft. A formation test recently indicated heavy oil but the test was inconclusive and a pumping gage is scheduled for the next few days. This property is owned in fee by Ralph Lloyd and the late Joseph Dabney and was acquired approximately 20 years ago as prospective oil land.

W. R. Gerard 1 Acquistapace in the Santa Maria Valley field which showed a large flow of oil and gas a few weeks ago has settled down to 300 bbl. per day through a 25/64-in. bean and is producing 400,000 cu. ft. of gas along with the crude. This well came in a gas well making only a spray of oil several weeks ago and was shut in immediately subsequent to completion. After standing idle for some time it was opened up for a test and began flowing at a daily rate of 1,250 bbl. but started to decline slowly after the head had been reduced.

Union Oil Co. in its attempt to extend the eastern limits of the Santa Maria Valley field failed to find the productive Monterey in 1 Cox but instead found the Franciscan basement at the comparatively shallow depth of 2,400 ft. and consequently abandoned the hole as a failure.

COASTAL DISTRICT OPERATIONS

Bardsdale, Ventura County: R. S. Lytle 1 Elkins, 6-3n-19w, flowed 119 bbl., 29.1-gravity, 3 per cent cut, 10/64-in. bean, pressures 100/300 lb., T.D. 5,681 ft., P.B. 4,919 ft., perf. 4,808-4,919 ft., completed in Miocene oil sand, new discovery.

Newhall Potrero, Los Angeles County: Barnsdall Oil Co. 33 Rancho San Francisco, 35-4n-17w, flowed 125 bbl., 27.8-gravity, 7 per cent cut, 24/64-in. bean, tubing pressure 50 lb., T.D. 7,746 ft., P.B. 7,300 ft., perf. 6,477-6,768 ft., 6,810-6,917 ft., 7,190-7,297 ft., top first Modelo oil zone 6,475 ft., top third Modelo oil zone 7,191 ft., 75° dips at 7,616 ft.

Santa Maria Valley, Santa Barbara County: Union Oil Co. 1 Cox, 29-10n-33w, abandoned in Franciscan basement, 2,250-2,400 ft., T.D. 2,400 ft.

Ventura Avenue, Ventura County: Lloyd Corp. 9 Lloyd, 23-3n-23w, flowed 1,050 bbl., 33.5-gravity, 1 per cent cut, 1,200,000 cu. ft. gas, 26/64-in. bean, pressures 500/750 lb., T.D. 10,017 ft., perf. 9,618-10,017 ft., completed in lower Lloyd zone of Pliocene age.

SAN JOAQUIN VALLEY

Standard of California, which discovered a new oil field in the Pleasant Valley or Guijarral district of Fresno County a week or so ago, is gradually decreasing production of the discovery well by reducing the bean. Plans are under way for the drilling of another well and it is quite probable that development may be undertaken by other operators on adjacent property. The Pleasant Valley field is expected to be a discovery of major importance provided faulting does not restrict the productive acreage. Little is known about structural conditions although the accumulation is undoubtedly an old shore line similar to conditions existing in the Coalinga Nose to the north. Production is coming from Eocene although in the discovery well at Pleasant Valley the sand did not possess the porosity of most pays at Coalinga Nose. The new oil sand is about midway between the Gatchell at Coalinga and the McAdams in the Kettleman North Dome field. Gravity of the oil is similar to that produced in the southern part of the Coalinga Nose field and the low gas-oil ratio is common to both areas. It is not at all improbable that the Pleasant Valley field is another productive area along the Coalinga structure in which case it would bear a similar position in the south that the northeast area bears to the original Gatchell sector. This would mean a limited unproductive spot between the two areas inasmuch as a dry hole practically precludes any direct connection with the Coalinga Nose field. Most engineers believe the Pleasant Valley field will show a more east-west trend than Kettleman North Dome or Coalinga Nose in view of a possible fault that may extend across the northern flank of the new pool.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: General Petroleum Corp. 42-12 Belridge, 12-29s-21e, pumped 47 bbl., 13-gravity, 30 per cent cut, T.D. 1,145 ft., P.B. 1,116 ft., 100-mesh perf. 907-1,115 ft., completed in upper Belridge zone of Pliocene age.

E. A. Parkford 7 Belridge, 12-29s-21e, pumped 85 bbl., 12.9-gravity, 17 per cent cut, T.D. 1,119 ft., 120-mesh perf. 927-1,117 ft., completed in Parkford zone of Pliocene age.

East Coalinga wildcat district, Fresno County: R. S. Lytle 43-A-24 Lobre, 24-19s-15e, abandoned in Kreyenhagen shale 4,328-44 ft., T.D. 4,344 ft., no important showings logged.

Coalinga, East, Fresno County: Shell Oil Co. 157-29 fee, 29-19s-15e, pumped 204 bbl., 19.9-gravity, 4 per cent cut, T.D. 2,320 ft., perf. 2,197-2,248 ft., 2,278-2,318 ft., black shale 2,070 ft., completed in East Coalinga zone of Miocene age.

Shell Oil Co. 162-32 fee, 32-19s-15e, pumped 50 bbl., 21-gravity, 8 per cent cut, T.D. 2,865 ft., perf. 2,709-2,853 ft., completed in East Coalinga zone of Miocene age.

Kern Front, Kern County: S. & S. Oil Co. 1 Kernco, 10-28s-27e, pumped 48 bbl., 13.5-gravity, 2 per cent cut, T.D. 2,214 ft., 187-mesh perf. 2,194-2,214 ft., M point 2,036 ft., N point 2,123 ft., Q point 2,193 ft., completed in Kern Front zone of Pliocene age.

Standard Oil Co. 14-5 fee, 5-28s-27e, pumped 152 bbl., 14.6-gravity, 3 per cent cut, T.D. 2,780 ft., 100-mesh perf. 2,574-2,778 ft., M point 2,390 ft., N point 2,505 ft., Q point 2,574 ft., R point 2,600 ft., S point 2,723 ft., completed in Kern Front zone of Pliocene age.

Standard Oil Co. 15-5 fee, 5-28s-27e, pumped 98 bbl., 13.9-gravity, 52 per cent cut, T.D. 2,820 ft., 100-mesh perf. 2,600-2,818 ft., M point 2,424 ft., N point 2,531 ft., Q point 2,600 ft., R point 2,629 ft., S point 2,745 ft., completed in Kern Front zone of Pliocene age.

Standard Oil Co. 6-8 fee, 8-28s-27e, pumped 86 bbl. net, 13.3-gravity, 50 per cent cut, T.D. 2,870 ft., 100-mesh perf. 2,644-2,866 ft., M point 2,463 ft., N point 2,578 ft., Q point 2,645 ft., R point 2,742 ft., S point 2,808 ft., completed in Kern Front zone of Pliocene age.

Standard Oil Co. 35-15 fee, 15-28s-27e, pumped 41 bbl., 13.4-gravity, 12 per cent cut, T.D. 2,465 ft., 100-mesh perf. 2,298-2,463 ft., M point 2,150 ft., N point 2,245 ft., Q point 2,298 ft., R point 2,384 ft., S point 2,446 ft., completed in Kern Front zone of Pliocene age.

Westates Petroleum Corp. 10 Cauley, 16-28s-27e, pumped 28 bbl., 14.5-gravity, 3 per cent cut, T.D. 2,962 ft., P.B. 2,840 ft., 125-mesh perf. 2,940-62 ft., M point 2,584 ft., N point 2,710 ft., Q point 2,793 ft., S point 2,924 ft., completed in Kern Front zone of Pliocene age.

Lost Hills, Kern County: Universal Consolidated Oil Corp. 21-D fee, 30-26s-21e, pumped 27 bbl. net, 16.7-gravity, 22 per cent cut, T.D. 1,485 ft., 80-mesh perf. 863-1,485 ft., completed in Lost Hills zone of Pliocene age.

Midway-Sunset, Kern County: Chanslor-Canfield Midway Oil Co. 49-9 fee, 9-32s-23e, pumped 37 bbl. net, 15.8-gravity, 50 per cent cut, T.D. 1,620 ft., perf. 1,184-1,330 ft., 1,492-1,590 ft., completed in Midway zone of Pliocene age.

North American Oil Consolidated Oil Co. 53 Lockwood, 16-32s-23e, pumped 38 bbl., 12.1-gravity, 3 per cent cut, T.D. 1,249 ft., P.B. 1,030 ft., perf. 505-1,030 ft., completed in upper Midway zone of Pliocene age.

Richfield Oil Corp. 5-A Fairfield, 11-31s-22e, pumped 33 bbl. net, 15.2-gravity, 50 per cent cut, T.D. 1,290 ft., perf. 1,180-1,270 ft., completed in upper Midway zone of Pliocene age.

Union Oil Co. 3 Midway Northern, 7-11n-23e, pumped 294 bbl., 11.6-gravity, 15 per cent cut, T.D. 1,956 ft., P.B. 1,820 ft., perf. 1,709-1,818 ft., completed in Midway zone of Pliocene age.

Round Mountain wildcat district, Kern County: General Petroleum Corp. 1 Railroad, 23-28s-28e, abandoned in gray Vedder sand of Miocene age 2,608-44 ft.; this zone, which is productive in other nearby fields, was barren at this location; T.D. 2,644 ft.

Round Mountain, Kern County: Shell Oil Co. 1-17 Jewett, 29-28s-29e, pumped 42 bbl. net, 16.4-gravity, 66 per cent cut, T.D. 1,760 ft., 120-mesh perf. 1,406-1,699 ft., completed in Vedder zone of Miocene age.

LOS ANGELES BASIN

Texas Co. is making good progress with 5-J-1 Buena Park in the Buena Park field and 3-A McNally in the La Mirada district of Orange County and the status of these two districts may be determined in the near future. At Buena Park, out of four wells drilled to date, Texas Co. has two small pumpers and two dry holes. The present well may define or limit the field

(Continued on Page 92)

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N. CENTRAL TEXAS

Caddo Lime Pool Assured In Western Jack County

WICHITA FALLS, Tex.—Shell Oil 1 Wolfe, 481 ft. from east line and 425 ft. from south line Section 3341, T.E.&L. Survey, 3 miles east of Jermyn, in western Jack County, assured a new Caddo lime pool last week. After a treatment with 4,000 gal. of acid, the well cleaned itself and flowed 47 bbl. of oil into the pits in 6 hours, with an estimated gas volume of 1,000,000 cu. ft. The hole had been plugged back from 5,631 ft. and casing was perforated from 4,375 ft. to 4,405 ft. This opens the second new Caddo lime field in Jack County this year, the first being 8 miles north at Hanlon-Buchanan et al 1 Ellis & Dubose, in the J. W. Williams Survey A-877, which is 1½ miles southwest of the Hoefle pool.

In southeast Jack County, Joe A. Worsham 1-A L. A. Meador, Lot 22, Henderson County School Land, west of Gibtown, was drilling ahead after setting liner in a good show of gas and distillate struck at 6,090 ft. in Ellenburger lime.

A new Bend conglomerate pool for northeast Archer County seems likely as Whitaker Oil Co. 2 Coleman, Block 25, Brazos County School Land Survey, was bailing oil from 5,676-99 ft. after treating with 3,000 gal. of acid.

In the Cooper pool of northern Archer County, Belfort Oil Co. 1 Kemp & Kempner, Section 67, K.W.F. V.L. Survey, tested a small amount of oil from perforations at 4,146-66 ft. opposite the K.M.A. pay, and was preparing to acidize. The well had been drilled to 5,070 ft. in Ellenburger, which was dry, and operators perforated opposite the Caddo lime at 4,874-94 ft., recovering some oil, and again perforated upper Caddo from 4,594 to 4,600 ft., recovering salt water.

In Clay County, the deep test being drilled by Bridwell Oil Co. in the Halsell pool, the 11-A Halsell, John Rogers Survey, topped Ellenburger at 5,624 ft. and had staining and small shows of oil in the section between 5,646-88 ft. and was drilling ahead.

The Mississippi lime Antelope pool in southwest Clay County was defined on the southeast when Shell 23-C Henderson, Section 2624, T.E.&L. Survey, had no shows and was abandoned at 5,846 ft.

On the southeast edge of the Walnut Bend pool of northeast Cooke County, which was recently extended by Sinclair Prairie 1 Winger in a new pay, the same company's 9 Cox had recovered a total of 36 ft. of saturated cores from the Winger pay of the lower Strawn series, and was coring ahead below 5,516 ft. In the same area, Sun 1 Bacon had a show of gas from 3,612 to 3,733 ft. in sand, drilled to 3,940 ft. and ran electrical survey to test the porosity.

In northeast Montague, Continental Oil 1 Fleming, wildcat in the Secrest Survey, had sand showing oil at 3,375-83 ft. and was drilling ahead after freeing stuck drill pipe below 3,415 ft. A drill-stem test showed only drilling mud in 45 minutes. The same company has moved in rig for 1 Kaneaster, 556 ft. from north and west of Section 56, E.T.R.R. Survey, on an east offset to the big producer brought in from the upper Bend series 2 weeks ago.

New wildcat for Throckmorton County, which will test the Mississippi lime is Humble 1 Kelly, 330 ft. from northwest, 990 ft. from northeast lines, Block 51, Comanche Indian Reservation. It is 3½ miles southeast of the Humble 1 Mathews, Tarter Survey, which opened Mississippi lime production in southwestern Throckmorton County last year.

NORTH TEXAS COMPLETIONS

Wildcats

Clay County: Perry Browning 1 fee, 860 ft. from S and E, Blk. 32, Byers Bros. subd., dry, T.D. 1,801 ft.

Jack County: Rathke Oil 1 S. Jagoda, 660 ft. from S and W westerly SW cor. J. Erwin Sur. A-1,608, show 3,746-50 ft. sand, show 4,466-4,510 ft. sandy lime, dry, T.D. 4,803 ft.

Wichita County: H. B. Dudley 1 E. Waggoner, Robert Evans Sur. A-74, dry, T.D. 1,024 ft.

Grace & Grace 1 W. H. Ogden, 330 ft. from S and W lines, Sec. 36, H.&G.N. Sur. A-409, dry, T.D. 2,015 ft.

Wilbarger County: C. B. Christie 1 J. L. McCrary, SE NW SE Sec. 64, Blk. 14, H.&T.C. Sur., elev. 1,234 ft., dry, T.D. 2,003 ft.

Fields

Archer County: W. T. Hutcheson, Jr., 1 L. W. McCrory, 330 ft. from S, 818 ft. from W, Sec. 121, A.T.N.C.L. subd., 10 bbl., pay 595 ft., sand, T.D. 605 ft.

K.M.A., Wichita County: W. H. Hammon 17 fee, 9,300 ft. from N, 1,380 ft. from W, Sec. 2, E.T. Sur. A-762, 195 bbl., pay 3,987 ft., sand, T.D. 4,003 ft.

Lido, Wilbarger County: Lido Oil 24 W. T. Waggoner Est., SW NW NW Sec. 52, Blk. 2, H.&T.C. Sur., flowed 1,224 bbl., pay, perf. 3,660-70 ft., lime, T.D. 3,992 ft.

Petrolia, Clay County: F. H. Gohlke 1 Panhandle Ref. Co., 330 ft. from S and W Blk. 47, Parker County School Land, elev. 910 ft., dry, T.D. 1,772 ft.

Rock Crossing, Wilbarger County: Phillips 224 W. T. Waggoner, Sec. 44, Blk. 4, H.&T.C. Sur., 15 bbl., pay 1,863 ft., sand, T.D. 1,889 ft.

Scotland, Archer County: Shell Oil 7-C William Coleman, 330 ft. from N, 990 ft. from W Sec. 74, A.T.N.C.L. subd., pumped 49 bbl., pay 5,140 ft., lime, T.D. 5,260 ft.

WEST CENTRAL TEXAS

ABILENE, Tex.—S. B. Roberts and Fain & McGaha 1 Pardue, Section 1, S.F.I.W. Sur. A-475, Haskell County, swabbed 75 bbl. oil from saturated Palo Pinto lime from 3,409-11 ft. and operators prepared to take a few more feet of pay before rigging up pumping equipment. The well is ¾ mile north of the recent completion which flowed 100 bbl. per hour after an acid treatment of 2,000 gal., reviving the interest in Palo Pinto production possibilities in northeastern Jones and southeast Haskell counties.

Jones County received a new wildcat operation last week at Hunter & Hunter 1 Minter estate, 660 ft. from south and east lines of Lot 7, Section 41, Block 2, S.P. Survey, 12 miles west of Anson. It is scheduled to go to 3,400 ft., testing the Swastika sand and Noodle Creek lime.

In northwestern Callahan County, Hunter & Hunter and F. Kirk Johnson are nearing expected pay horizon at 1 Martin in Section 69, Block 14, T.&P. Survey.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Callahan County: E. M. Thomasson 1 J. S. Harlow, NE NW Blk. 75, Comal County School Land, dry, T.D. 451 ft.

Shackelford County: R. H. Roark 1 Todd, SW SW NE Sec. 11, Blind Asylum Land, dry, T.D. 664 ft.

Fields

Brown County: Central Texas Gas 1 Myrick, Sec. 57, W. K. Dalton Sur., 1,250,000 cu. ft. gas, pay 1,704 ft., T.D. 1,872 ft.

Eastland County: Hickok Prod. 1 Bill Childress, C SW Sec. 67, Blk. 4, H.&T.C. Sur., 2,000,000 cu. ft. gas, pay 3,623 ft., T.D. 3,629 ft.

Loving, Stephens County: Wittmer, Knight & Ewing 5 D. B. Loving, SW SE Sec. 66, Orphan Asylum Lands, flowed 100 bbl., pay 3,481 ft., Caddo lime, T.D. 3,507 ft.

Wimberly, Jones County: Ungren & Frazier et al 1 M. A. Moore, SW cor. 80-acre tract, Lge. 137, G. Martinez Sur., dry, T.D. 2,257 ft.

Coker, Coleman County: Anderson-Prichard 1-A Milton Coker, SE SW NE, Sec. 72, Blk. 2, G.H.&H. Sur., elev. 1,871 ft., pumped 24 bbl. oil, 17 bbl. water, pay 3,004 ft., sand, T.D. 3,016 ft.

Merkel, Taylor County: Keener Oil & Gas 1 Gilmore, Sec. 28, Blk. 17, T.&P. Sur., elev. 1,788 ft., dry, T.D. 2,675 ft.

Santa Anna, Coleman County: Coleman Gas Co. 1 Gieseke, M. Little Sur., 6,060,000 cu. ft. gas, pay 2,213 ft., Marble Falls lime, elev. 1,632 ft., T.D. 2,259 ft.

Louisiana Gulf Coast

(Continued from Page 72)

drilled out to P.B. T.D. 10,182 ft., perf. 10,155-78 ft., 13.2 bbl. through ½-in. choke, with 954,000 cu. ft. gas, T.P. 300 lb., C.P. 800 lb.

Continental 1 J. G. Vidrine, 10-4s-2e, O.W.O., old T.D. 10,248 ft., cleaned hole, set retainer at 10,137 ft., squeezed old perforations, drilled out to P.B. T.D. 10,163 ft., perf. 10,150-60 ft., 33 bbl. on gas lift, through 36/64-in. choke, T.P. 250 lb., C.P. 600 lb.

POMONA PUMPS STRETCH YOUR PUMPING DOLLAR

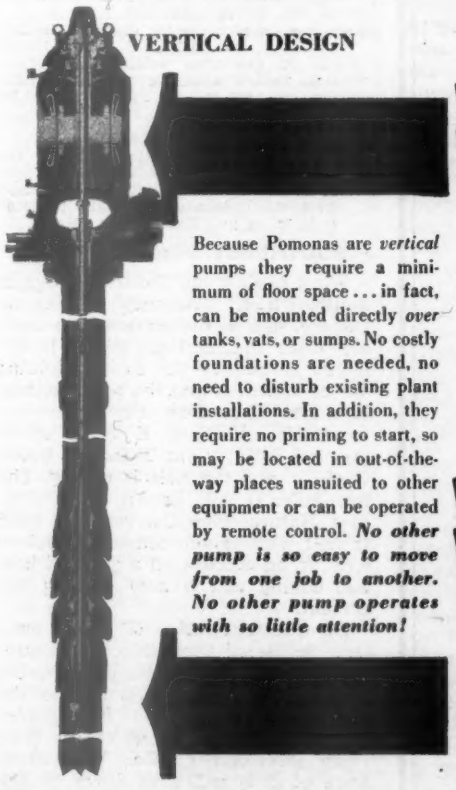
TAKE ADVANTAGE OF CONSTRUCTION

ARE YOU TAKING *FULL* ADVANTAGE OF POMONA'S MANY CONSTRUCTION FEATURES?

Pomona owners are doubly fortunate in these times because no other type pump can match Pomonas for high efficiency . . . for adaptability to varying job requirements . . . for low maintenance and operating costs . . . and for all-around ability to handle virtually *any* pumping application encountered.

Among the *many* construction features that make Pomonas so uniformly efficient under a wide variety of operating conditions, the following are typical . . .

VERTICAL DESIGN



Because Pomonas are *vertical* pumps they require a minimum of floor space . . . in fact, can be mounted directly *over* tanks, vats, or sumps. No costly foundations are needed, no need to disturb existing plant installations. In addition, they require no priming to start, so may be located in out-of-the-way places unsuited to other equipment or can be operated by remote control. ***No other pump is so easy to move from one job to another. No other pump operates with so little attention!***

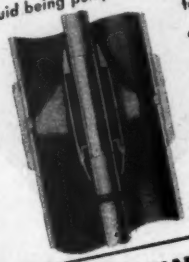
Let your nearby Pomona dealer check over your installation and suggest ways you can make greater use of the many advanced construction features incorporated in your Pomona pump!

SEMI-OPEN IMPELLERS

Pomona's Semi-Open Impellers and Bulbous Vaned Pump Bowls represent a vital advancement in both design and performance. Pomona impeller clearance can be adjusted quickly and easily at the pump head, permitting pump capacity to be varied up to 60% of design point without costly throttling. Semi-open impellers will also handle gritty, pulpy or fluctuating flows more efficiently, and greatly minimize risk of vapor, gas or air locking. **Thus, Pomonas can be quickly adapted to a wide range of pumping requirements and fluids with uniformly high operating efficiency!**

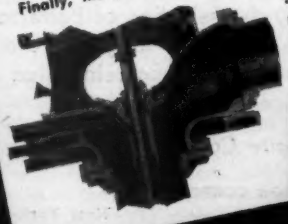
WATER LUBRICATION

In Pomonas, ALL bearings below the motor head are self-lubricated by the fluid being pumped. There are no oil tubes or grease chambers to leak, therefore no risk of contaminating either product or equipment. Also, because lubrication is foolproof, positive, Pomonas take care of themselves without need for frequent attention. **You can use your Pomona for practically any pumping job in your plant with perfect safety to the pump and to the product!**



OPEN DRIVE SHAFT

Pomona impellers are driven by an open drive shaft which eliminates the buying, installing and servicing of a separate housing when conversions are made. Because there are no oil tubes or grease chambers, Pomonas handle fluids under a wide range of temperatures, further increasing their versatility. Finally, the pump can be lengthened or shortened by simply adding or removing standard length shaft sections . . . can be converted from deepwell primary water supply to close-coupled industrial pumping—or vice versa—at minimum cost. **Pomona's need never be idle!**



POMONA
Water-Lubricated
PUMPS

DIVISION OF JOSHUA HENDY IRON WORKS

APPALACHIAN FIELDS

West Virginia Test Reports Oil Showing in Oriskany

PITTSBURGH, Pa.—Except for another showing of oil in the Oriskany gas field in West Virginia, there was no important change in the lower eastern fields.

The most recent showing of oil in the Oriskany sand in the extension of the Elk-Poca gas field into Jackson County, West Virginia, is in the United Carbon Co.'s test on the Leslie H. Smith farm in the Ripley district from which 8 bbl. is being swabbed daily with little gas showing at 5,170 ft. Oriskany was logged at 5,088-5,129 ft., lime break 5,129-41 ft., sand 5,141-64 ft., show gas insufficient to gage at 5,090 ft.

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WEST VIRGINIA COMPLETIONS

Boone County, Peytona district: Owens, Libby-Owens 8 Lenning estate, 37,000 cu. ft. gas, Big lime topped 1,272 ft. and gas from Big lime, T.D. 1,575 ft.

Scott district: Owens, Libby-Owens 43 Cassingham Coal Land Co., 112,000 cu. ft. gas, Big lime 1,603 ft., Injun 1,831 ft., Berea 2,307 ft., gas in Berea, T.D. 2,367 ft.

Calhoun County, Sherman district: Z. N. Connolly 2 Clay McDonald, 8 bbl., Injun sand, T.D. 2,203 ft., South Penn Natural Gas Co. 14 J. S. Sharpes, 12 bbl., second Salt sand, 1,680 ft., Injun sand 2,175 ft., T.D. 2,228 ft.

South Penn Natural Gas Co. 17 J. S. Sharpes, 8 bbl. Big lime, 1,900 ft., Injun sand 2,135 ft., T.D. 2,203 ft.

Gilmer County, Center district: Carnegie Natural Gas Co. 1 Lucy Turner et al, 8 bbl., Maxton sand, T.D. 1,504 ft.

Marshall County, Liberty district: Manufacturers Light & Heat Co. 1 J. H. Teagarden, 3,500,000 cu. ft. gas, Pittsburgh coal, 943-47 ft., gas in Maxton sand, T.D. 2,067 ft.

Monongalia County, Battele district: O. M. Fox et al 1 Minnie M. and Tella Lemley, 600,000 cu. ft., gas from third Salt sand, Salt sand 2,123-73 ft., T.D. 2,194 ft.

Raleigh County, Trap Hill district: Godfrey L. Cabot, Inc. 1072 Rockhouse Fork Land Co., 852,000 cu. ft. gas after acidizing Big lime, R.P. 605 lb. 24 hr., T.D. 2,302 ft.

Wood County, Walker district: South Penn Natural Gas Co. 9 W. M. Eschanbacker, 10 bbl., Berea sand, T.D. 2,287 ft.

Wyoming County, Center district: Godfrey L. Cabot, Inc. 1071 C. C. Sharp, 260,000 cu. ft. gas after acidizing Big lime, P.B. before acidizing to base of Big lime at 2,961 ft., gas 2,685 ft. and 2,897 ft., R.P. 740 lb. 24 hr., T.D. 3,060 ft.

ORISKANY GAS FIELDS

Jackson County, Washington district: The United Fuel Gas Co. 5138 Everett Casto, 5,955,000 cu. ft. gas, Corniferous lime 5,195 ft., Oriskany 5,298-5,313 ft., R.P. 1,100 lb. 48 hr., T.D. 5,313 ft.

SOUTHEAST PENNSYLVANIA

Work is slow on Chestnut Ridge in South Union Township of Fayette County, due to the tendency to deviate from the vertical which is believed caused by the intense folding on the structure and the possible drag of faults. Here New Penn Development Co., William E Snee et al reached 7,075 ft. in 2 Indian Creek Coal Co. and the hole is caving. The formation is still brown shale. Peoples Natural Gas Co. reached 6,885 ft. in 1 Walters and cemented back to 6,757 ft. on account on a crooked hole and caving and is now drilling out cement.

On Chestnut Ridge (Preston) anticline in Derry Township, Westmoreland County, Peoples Natural Gas Co. has rig up for the deep test on the Camilla E. Giffin farm. In Ligonier Township, the deep test of the New Penn Development Co., William E. Snee et al is still shut down on the John and Eleanor Beck farm.

In Maryland, William E. Snee et al reached 6,486 ft. in 1 Speicher on the Accident dome, Garrett County, and drilling is being retarded by a bad hole.

(Continued on Page 85)

ROCKY MOUNTAIN AREA

Preliminary Survey For Major Pipe Line Reported Underway

DENVER, Colo.—The big news this week in the Rocky Mountain area centers around a scramble for crude oil to meet demands from local refiners in the area, from Canadian refiners and from buyers in the East. Plans for moving much of this oil involve the construction of pipe-line transportation facilities and preliminary surveys for at least one major project are reported under way. The production in the Big Horn basin, particularly Elk basin, is the magnet which is attracting the attention of producers and buyers.

The liveliest of these rumors is that the Stanolind Oil & Gas Co. has a crew in the field surveying an 8-in. line from Elk Basin field to Casper. The report was current in practically every office in Denver and caused speculation concerning its significance. Stanolind is heavily interested in the Elk Basin field where oil was discovered recently in the deeper Tensleep horizon, as well as in Grass Creek and other areas in the basin. The demand for crude in this territory has been steadily rising for the past year and with a new field of major importance being brought in with a big exploration campaign in the offing, the major companies are reported seeking strategic advantages to meet the new situation.

Plans under way some time ago for the construction of a synthetic-rubber plant at Casper went by the boards on account of the shortage of critical materials. Now it is reported that Stanolind has under consideration the construction of a 100-octane gasoline plant at Casper to run in part on crude from Elk basin. While the Elk basin Tensleep crude is a black oil, it has a gasoline content of around 30 per cent and can be used in conjunction with other supplies available in the Casper area in the production of the high-grade gasoline. In the event this plan, which is said to be in the tentative stage, does not materialize, it might not affect the pipe-line project. From Casper the crude could be moved through the Stanolind trunk line to Missouri to replace Salt Creek and Lance Creek crude now moving to the East and Salt Lake City and which is showing a slow but steady decline. The only other source of crude for the eastern trunk line is the Sinclair-Wyoming Oil Co. production in the Carbon-Sweetwater counties fields which is believed to be around 15,000 to 20,000 bbl. daily. The airline distance from Elk Basin to Casper is approximately 200 miles, but the most feasible route southward through the Big Horn Canon, thence eastward to Casper, is somewhat longer. It would open the entire Big Horn basin area to the eastern markets. The Stanolind move would offset plans under consideration for the construction of pipe-line facilities from the Big Horn basin to the Pacific Northwest which were disclosed a few months ago in a hearing conducted by the subcommittee of the Senate public lands committee.

The Ohio Oil Co., one of the largest operators in that area, has begun development of Tensleep production in Elk basin. Additional facilities for the transportation of the crude are said to include the construction of a line by the Illinois Pipe Line Co. from the field to the loading racks at Frannie. That company now operates a line to Greybull and transport the crude used in the Standard refinery at that place.

Another factor showing up in this picture in a large way is the Canadian demand for crude. During the past few weeks large shipments of crude from Wyoming through Montana has been in progress. It is now revealed that Imperial Oil, Inc., has purchased 250,000 bbl. of light oil in Grass Creek and has begun moving it to the Canadian plants. Recently Standard of New Jersey purchased the holdings, production and refinery of the Santa Rita Oil & Gas Co. in the Cut Bank field and is now operating these properties through the Carter Oil Co. This deal was looked upon as a move to provide additional crude for Canadian refineries, but the quantity available does not meet the full demand, particularly the war needs in western Canada and northwestern United States which has been hard pressed on account of reductions in shipments from California. A similar deal for light oil from Elk basin is said to be in the making. In the meantime, Montana refiners are being called upon to supply additional products in Washington and Oregon.

Development of the Tensleep pay in Elk basin is expected to take place on a considerable scale this year. Stanolind Oil & Gas Co. is rigging up rotary for its 1 Dengler, SW NE 35-9s-23e. This location is across the line in Carbon County, Montana, 3 miles north and a little west of the Minnelusa Oil Corp. discovery well. It is outside the limits of the productive area in the upper sands and in a fault block and approximately on the 2,600-ft. contour. It will be the next well which will throw much light on the productive area of the field in the new horizon. Ohio Oil Co. is now drilling its 4 Mack, ⅓ mile northwest of the Tensleep discovery, and upon completion probably will move to the southwest on the Mack 7 claim. Min-

(Continued on Page 92)

MICHIGAN

Promising Wildcat Discovery Reported in North Michigan

SAGINAW, Mich. — Interests and speculations of Michigan oil operators returned to northern Michigan last week as Ohio Oil Co. reported a promising wildcat discovery midway between the Reed City and Evart oil fields.

Shut down over the week end for lack of storage facilities, the well has produced approximately 360 bbl. of oil, flowing by heads, over a 12-hour period. The well, in Section 28, Cedar Township, Osceola County, filled with oil while drilling at 3,829-32 ft. and flowed 30 bbl. in 20 minutes. An hour later, it flowed another 24 bbl. after which the hole was deepened 2 ft. for testing.

Seven other developments were included in the week's completions report. Four were dry holes, two of them wildcat tests. Producers are a 55-bbl. well in Monitor-Bay County, a 32-bbl. well in Pine River Township, Gratiot County, and a 15-bbl. producer in Tallmadge-Ottawa.

While the new Ohio Oil discovery was expected to spur activity in this part of the state, 11 drilling permits for other sections were issued last week by the state Conservation Department, including five for Van Buren County, three for Bay, the rest for Allegan, Ingham and Mecosta counties.

MICHIGAN COMPLETIONS

Bay County, Monitor Township: Gulf Refining Co. 1 Sophia, C N½ NW SE 2-14n-4e, pumping 55 bbl., acidized, T.D. 2,869 ft.

Gratiot County, Pine River Township: Chartiers Oil Co. 2 Church, NE SW NE 31-12n-3w, flowing 32 bbl., acidized, T.D. 3,278½ ft.

Lake County, Chase Township: Cities Service Oil Co. 1 Plack, SW NW NE 27-17n-11w, wildcat test, dry, T.D. 3,785 ft.

Osceola County, Hartwick Township: Robert Bond and Eugene Hilliard 1 Thompson, C E½ NE NW 3-19n-8w, wildcat test, dry, T.D. 2,034 ft.

Lincoln Township: Gordon Oil Co. and Rowmor Corp. 1 Richards et al, C E½ SE SW 17-18n-10w, dry, T.D. 3,635 ft.

Ottawa County, Tallmadge Township: Fisher-McCall Oil & Gas Co. C-1 Wells, C E½ SE 1-6n-13w, pumping 15 bbl., acidized, T.D. 1,875 ft.

Van Buren County, Bangor Township: T. C. Hudson 1 Austin, SW SE SW 9-2s-16w, dry, T.D. 1,022 ft.

SOUTHWEST TEXAS

New Field in Prospect in Western Starr County

CORPUS CHRISTI, Tex.—Oil showings encountered in T. E. Stephens 1 Mrs. Gonzales, 10 miles north of Roma, in western Starr County, afford prospects of a new strike. Oil and mud flowed through the ½-in. choke while the well was cleaning under heavy pressures from perforations at 4,495-4,520 ft. The well was killed with heavy mud when closed-in pressures rose to 1,700 lb. Tubing pressure was about 150 lb. and casing pressure about 350 lb. Although no test was made, oil was estimated to be around 55 gravity. Total depth is 5,378 ft. The 5½-in. production string was set at 4,617 ft. A separator and a larger christmas tree are to be installed.

Continental Oil Co. 1 Albert West, 1½ miles southeast of the Oakville field, in Live Oak County, is reported to have found a new shallow sand. In a 19-minute test this wildcat flowed 800 ft. of 20-gravity oil from perforations at 1,432-36 ft. As the week closed the crew was running tubing and installing a christmas tree to complete the well.

Continental has spudded a wildcat test, 2 Dee Davenport, with which it is hoped to extend the Rincon field, in Starr County. It is 2 miles east of production. Two other trials in this area were failures at around 4,400 ft.

Sun Oil Co. has reported nothing impressive thus far in its 1-B Montalvo heirs, a mile southwest of the North Sun field, Starr County. The rig used at this wildcat was skidded from Sun 1 D. Laurel, which was temporarily abandoned.

Bridwell Oil Co. was rigging up for a wildcat, 1 F. W. Jones, 6 miles south of Clareville, in Live Oak County.

Phillips Petroleum Co. 1 William Huermann, 5½ miles south of the Turkey Creek field and the only wildcat under way in Nueces County, was trying to pull stuck drill stem. It is at 8,176 ft. and is reported to have encountered a gas-distillate sand at 6,990 ft.

Hondo Creek is the name given to the new field opened in Karnes County by Phillips and Adams Oil & Gas Co. 1 C. V. Reasoner, 5 miles southeast of Kenedy. On its latest reported test the Reasoner recovered 12 bbl. of oil in 5 hours through ⅝-in. choke. Tubing pressure was 173 lb. and gas-oil ratio 713 cu. ft. per barrel. Testing was being continued.

Sun 1 D. D. Oil Co., 2½ miles northwest of Gateway, Hidalgo County, was fishing for drill pipe at 6,840 ft. in shale.

A new wildcat project in the lower Gulf Coast district is Blanco Oil Co. and Al Buchanan 1 Nichols, 4 miles south of Kenedy, in Karnes County.

LOWER GULF COAST COMPLETIONS

Wildcats

Bee County: Blanco Oil Co. and A. Buchanan Co. 1 Eliza Moses Cook, W. C. McGill Sur. A-166, dry at 6,252 ft.

Bridwell Oil Co. 2 George A. Ray, 1½ mi. E of Beeville, dry at 4,410 ft.

Goliad County: Continental and Atlantic 1 J. E. Pettus, 6 mi. NE of Charco, 13.6 bbl. distillate and 914,600 cu. ft. gas through ⅝-in. choke, gas-oil ratio 67,250 (R.R. Com. etsimated 19,000,000 cu. ft. gas through 2-in. tubing, T.P. 2,600 lb.), perf. 7,743-60 ft., T.D. 8,982 ft., P.B. 7,796 ft., discovery.

Karnes County: American Liberty Oil Co. 1-W Otto von Roeder, 1 mi. E of Burnell, 87 bbl. distillate and 5,300,000 cu. ft. gas through ⅝-in. choke, T.P. 2,250 lb. (R.R. Com. estimated 60,000,000 cu. ft. gas open flow), T.D. 7,016 ft., discovery.

San Patricio County: Jay Simmons and Republic Natural Gas Co. 1 Dr. T. A. Anderson, 2 mi. SW of Sinton, dry at 7,262 ft.

Fields

Agua Dulce, Nueces County: Chicago Corp. 1 Irene Walton, 110 bbl. through ⅛-in. choke, T.P. 630 lb., C.P. 1,795 lb., gas-oil ratio 708, perf. 5,950-66 ft., T.D. 7,075 ft.

Quinto Creek, Jim Wells County: Kilgore Developers 1 W. Wichring, Casa Blanc grant, dry at 5,118 ft.

Seeligson, Kleberg County: Humble 8 King Ranch Cabeza, S.K.&K. Sur. 177, 148 bbl. through ⅛-in. choke, T.P. 1,150 lb., C.P. 1,250 lb., gas-oil ratio 610, T.D. 6,075 ft.

Seeligson, Jim Wells County: Shell 18 L. Seeligson, Willis Millican Sur., 89 bbl. through 7/64-in. choke, T.P. 390 lb., C.P. 1,200 lb., gas-oil ratio 450, T.D. 6,055 ft.

West Alfred, Jim Wells County: Wilcox 1 Ott Adams, W. M. Parks Sur. 29 A-341, dry at 5,000 ft.

SOUTH TEXAS COMPLETIONS

Wildcat

Live Oak County: Continental 1-A George West estate, J. L. Vaughn Sur. A-467, dry at 10,520 ft.

Fields

Aviator, Webb County: O. W. Killam 3-12 Bruni estate, Albercos grant, dry at 2,509 ft.

Colorado, Jim Hogg County: Humble 5 T. T. East, Las Moritas grant, 20 bbl pumping, T.D. 3,207 ft.

Humble 72-B King Ranch-Colorado, Las Moritas grant, dry at 3,455 ft.

South Campana, McMullen County: Magnolia 4 P. G. Kynette, B.S.&F. Sur. 101, A-138, dry at 3,035 ft.

SOUTH CENTRAL TEXAS COMPLETIONS

Wildcat

Travis County: Marts & Beaven, Inc., 1 Mrs. Emma Marcuse, 1½ mi. SW of Elroy, dry at 1,240 ft.

Fields

Pearsall, Frio County: Falcon-Seaboard Drilling Co. 3 Halff & Oppenheimer, J. H. Gibson Sur. 15, 80 bbl. through ⅛-in. choke, T.P. 370 lb., gas-oil ratio 300 lb., T.D. 3,960 ft.

TEXAS GULF COAST

Drilling Continues at Deep Test in Old Ocean Field

HOUSTON, Tex.—Unless unforeseen trouble develops, the deepest hole in the world is likely to be recorded by J. S. Abercrombie and Magnolia Petroleum Co. B-1 McDonald, in the Old Ocean field of Brazoria County. As last week closed, the McDonald had passed the 14,100-ft. mark and was deepening at the rate of about 30 ft. daily. When the well started it was planned to go to 14,000 ft. Now its ultimate depth depends mainly on the behavior of the hole, it was said by the operators. The 7-in. casing was set at 12,711 ft., so there is now around 1,400 ft. of open hole. No untoward incidents have interrupted progress thus far and the crew is not inviting any by haste or lack of care. The deep-well record now is held in California with a mark of 15,004 ft. A dry hole was drilled to 14,582 ft. in Washita County, Oklahoma, by Continental Oil Co. The McDonald hole comes next.

No tests have been made at the McDonald since it passed the normal pay zones, which lie in the Old Ocean field at 9,400 to 11,000 ft. If the operators fail to strike a pay at lower levels they can plug back and produce from the regular zone.

Triple completion of a well, said to be without precedent in the annals of oil, is under way at Superior Oil Co. A-5 McWhorter, in the Lake Creek gas-distillate field of Montgomery County, Texas, where the company already has 10 producing wells. In recovering from three different sands at one time the lowest sand will be produced from the tubing, the top sand from the space between the 5-in. casing string and the

7-in. casing string, and the middle sand will be produced through the space between the tubing and the 5-in. The crew has run 5-in. liner for completion in the third sand. A fourth sand has been cased off. Dual completions are commonplace in this territory. The saving in critical material made possible by a triple completion is expected to extend the practice.

The week produced nothing conclusive in Stanolind Oil & Gas Co. 1 G. T. Pattison, Waller County wildcat, which has been regarded as likely to extend the big Katy gas field or to open a new pool. This well, 3½ miles north of the Katy field, has been drilled to 8,000 ft., and it was planned to begin a series of tests, with 5½-in. casing landed at about 7,870 ft. A drill-stem test in the first Katy sand, logged at 6,520 ft., afforded evidence of a good gas well.

Cities Service Oil Co. 1 Frank Stephens, which has opened a new field in Colorado County, a mile east of Ramsey, flowed 100 bbl. of distillate and 3,410,000 cu. ft. of gas through ¼-in. choke, with perforations at 8,948-60 ft., at the latest reported test.

TEXAS GULF COAST COMPLETIONS

Wildcats

Jackson County: Butcher-Arthur Co. 1 W. T. Caswell, 7 mi. SE of Edna, dry at 6,510 ft.

Wharton County: Magnolia 1 Kountze-Stewart, 5 mi. SW of Danevang, dry at 8,832 ft.

Continental 1 E. O. Swanson, 9 mi. NE of Louise, dry at 5,543 ft.

Fields

Barbers Hill, Chambers County: Mills Bennett Producing Co. 3-B Gulf fee, W. Bloodgood Sur. A-5, O.W.W.O., old T.D. 4,848 ft., old P.B. T.D. 4,698 ft., cleaned hole to 4,450 ft., perf. 4,354-4,419 ft., 16 bbl. pumping.

Danbury, Brazoria County: Rowan Drilling Co. 19 T. Jamison, H. Austin Sur., 74 bbl. through ⅛-in. choke, T.P. 400 lb., C.P. 100 lb., gas-oil ratio 400, perf. 3,550-66 ft., T.D. 5,875 ft.

Magnet-Withers, Wharton County: Texas C-23 Pierce estate, workover, old T.D. 5,556 ft., drilled out to bottom, 25 bbl. through 6/64-in. choke, T.P. 750 lb., C.P. 900 lb., gas-oil ratio 2,790, perf. 5,549-55 ft.

Mayo, Jackson County: Stanolind 3 H. A. Meyer, M. L. York Sur. A-313, 31,500,000 cu. ft. gas open flow, perf. 5,102-06 ft., T.D. 5,582 ft., P.B. 5,296 ft.

Pierce Junction, Harris County: Hamill & Smith 1 Higgins, B.B.B.&C.R.R. Co. Sur. A-179, O.W.W.O., old T.D. 4,058 ft., cleaned hole to 3,341 ft., 95 bbl. through 9/64-in. choke, T.P. 270 lb., C.P. 400 lb., gas-oil ratio (S.I.) 400, perf. 3,323-40 ft.

Stewart, Jackson County: Salt Dome Corp. 1 K. L. Betts, George Sutherland Sur. A-75, 3 bbl. open flow, perf. 4,995½-5,000½ ft., T.D. 5,008 ft.

West Beaumont, Jefferson County: Stanolind 8 Treadway Land Co., H. Williams Sur. A-56, 2,720,000 cu. ft. dry gas through ¼-in. by 6-in. positive chokes (S.I.), T.P. 1,815 lb., C.P. 1,855 lb., estimated open flow through 2-in. tubing 28,000,000 cu. ft. gas, S.I. pressure on tubing and casing 1,865 lb., perf. 4,654-60 ft., T.D. 5,920 ft. P.B. 4,665 ft.

West Mauritz, Jackson County: J. B. Coffee 1 Westhoff-McCrory, M. L. York Sur. A-312, 129 bbl. through 7/64-in. choke, T.P. 650 lb., C.P. 800 lb., perf. 5,478-82 ft., T.D. 5,860 ft.

ILLINOIS FIELD REPORT

Franklin County Wildcat Finds Oil in Aux Vases Sand

MATTOON, Ill.—The Seaboard Oil Co. set casing last week to test saturation found in the Aux Vases sand at 3,122-28 ft. in their 8 U. S. Coal and Coke, NE NE 26-6s-4e. A drill-stem test of that formation showed gas in 16 minutes, 1,560 ft. of pipe-line oil and 60 ft. of oil-cut mud in 1 hour. Located about 3 miles north of Thompsonville, and 1½ miles from nearest oil production, the well opens a new producing area. While the pay section in the well is not very thick, the sand shows good porosity and should make a good producer.

The continuation of production eastward in the Iola pool of Clay County is regarded as a distinct possibility following reports that the Central Pipe Line Co. 1 Reed, NW 14-5n-5e, the easternmost well in the field, checked only 1 foot lower structurally than the Homer Luttrell 8 Reed to the west. Cypress sand was topped at 2,130 ft. in the 1 Reed and 8 ft. of saturation was cored. Operators then drilled 2 ft. deeper and the well was still in saturated sand. Casing was set and standard tools were being moved in to drill plug and test the well.

Drilling was resumed late last week at the Tarlton Oil et al 1 A. Dyroff, NE SW SE 28-1n-10w, a sub-Trenton test on the Dupo structure in St. Clair County. The well had been shut down for a few days while drill cuttings were being checked.

There is a widespread interest in the 1 Dyroff since it is scheduled to penetrate the extreme lower Ordovician formations, which have been little explored hitherto in southern Illinois.

ILLINOIS COMPLETIONS

Wildcats

Clark County: Da Vees Oil 2 Lee, SE SW SW 29-11n-14w, dry at 1,414 ft., show gas and oil 870 ft.

Henderson County: J. W. Sword 1 Hanna, SE SE 14-9n-4w, dry at 610 ft.

Madison County: Kingwood 1 J. E. Niggle, NE NE NE 29-5n-5w, dry at 2,713 ft., Devonian 1,864 ft., Trenton 2,509 ft.

St. Clair County: H. C. Robertson 1 Karvan, NW NE SE 17-2s-8w, dry at 1,480 ft., Trenton 1,410 ft.

Wayne County: Pure 1 Walter Farris, NE SW 7-1s-8e, dry at 3,301 ft., Glen Dean 2,545 ft., Barlow 2,750 ft., Aux Vases sand 3,043 ft., Ste. Genevieve 3,100 ft., Rosiclare 3,117 ft., Fredonia 3,155 ft.

Deep Rock 1 Gardner, SW SW NW 15-3s-8e, dry at 4,002 ft., Menard 2,580 ft., Vienna 2,671 ft., Tar Springs 2,777 ft., Glen Dean 2,821 ft., Golconda 2,945 ft., Barlow 3,060 ft., Cypress sand 3,135 ft., Paint Creek 3,203 ft., Benoist sand 3,249 ft., Aux Vases sand 3,390 ft., Ste. Genevieve 3,446 ft.

White County: Ivan White 1 M. Fitzgerald, SW NW NW 31-4s-14w, dry at 2,390 ft., Palestine 2,087 ft., Menard 2,182 ft., Vienna 2,321 ft., Tar Springs sand 2,323 ft.

Fields

Bible Grove, Clay County: Texas 4 E. F. Bloemker, NW NE NE 4-5n-7e, pumped 164 bbl., natural, Weller 2,518-30 ft., T. D. 2,540 ft.

Walter Duncan 1 F. Brink, NW NW NW 3-5n-7e, pumped 200 bbl., Weller 2,531-41 ft., T. D. 2,541 ft.

Texas 5 M. Bloemker, NW SW NW 3-5n-7e, pumped 130 bbl., Weller 2,524-30 ft., saturated sand 2,530-37 ft., T. D. 2,537 ft.

Brown, Marion County: Lilly 1 Burge, SW NE NW 16-1n-1e, pumped 64 bbl., shot 1,661-71 ft. in Weller, T. D. 1,674 ft.

Coil, Wayne County: W. C. McBride 2 Youngblood-Gregory, SE SW SE 19-1s-5e, pumped 60 bbl., shot 2,883-93 ft., Aux Vases sand 2,882-90 ft., T. D. 2,908 ft.

Dale, Hamilton County: Gulf Refg. 1 Della Harrawood, 331 ft. SL, 460 ft. EL NW 19-6s-7e, pumped 30 bbl. oil and 51 bbl. water, perf. 2,775-90 ft., old well deepened from 3,078-99 ft.

East Centerville, White County: Skelly 3 Bryant, E½ SE SW 7-4s-10e, pumped 71 bbl., shot 2,475-2,526 ft., Tar Springs sand 2,474-90 ft., 2,510-27 ft., T.D. 3,103 ft.

East Inman, Gallatin County: Carter 5 E. H. Busiek, SE NW SE 11-8s-10e, pumped 111 bbl., shot 2,049-57 ft., Clore 1,721-36 ft., Tar Springs sand 2,049-57 ft., T.D. 2,057 ft.

Friendsville, Wabash County: Magnolia 3 Sturman, SE NE NE 10-1s-13w, pumped 21 bbl. oil and 1 bbl. water, shot 2,337-46 ft., Cypress sand 2,333 ft., T.D. 2,346 ft.

Iola, Clay County: Teas 1 F. W. Risser, NW NW SE 15-5n-5e, pumped 174 bbl., shot 2,328-36 ft., Aux Vases sand 2,319-31 ft., T.D. 2,336 ft.

Texas 9 A. Kidwell, SE NW NW 15-5n-5e, pumped 25 bbl., natural, Aux Vases sand 2,344-51 ft., T.D. 2,351 ft.

Texas 6 Kidwell, SW SE NW 15-5n-5e, pumped 90 bbl., natural, Aux Vases sand, 2,344-61 ft., T.D. 2,361 ft.

Luttrell 8 Reed heirs, SE NE NE 15-5n-5e, pumped 175 bbl., natural Weller 2,126-48 ft., T.D. 2,148 ft.

Iron, White County: Carter 1 Oscar Phillips, NW NW NE 19-6s-9e, pumped 44 bbl. oil and 5 bbl. water, shot 2,900-20 ft., Aux Vases sand 2,898-2-924 ft., T.D. 2,924 ft.

Johnsonville, Wayne County: W. R. Brown 1 Mary Baily, N½ NE SE 26-1n-6e, dry at 3,069 ft., Glen Dean 2,565 ft., Aux Vases sand 3,062 ft.

King, Jefferson County: Lewis Prod. 1-B State Game Farm, pumped 37 bbl. oil and 14 bbl. water, shot 2,714-48 ft., Aux Vases sand 2,718-39 ft., pay 2,710-46 ft., T.D. 2,805 ft.

Louden, Fayette County: Carter 28-2 H. Beck, SE SE SE SW 21-8n-3e, gas input well, Benoist sand 1,460-88 ft., T.D. 1,512 ft.

Carter 8-D Fortner, NW SE 10-8n-3e, dry at 3,160 ft., Devonian 3,070 ft.

Carter 3 Alsop, NE SE SW 3-8n-3e, pumped 126 bbl., shot 1,500-16 ft., Weller 1,500 ft., T.D. 1,525 ft.

Mount Erie, Wayne County: N. V. Duncan

(Continued on Page 85)

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KANSAS, NEBRASKA

Northwestern Stratigraphic Test Reports Show of Oil

STANOLIND Oil and Gas Co. 1 McCue, NW NW SE 29-1-26w, a stratigraphic test in Decatur County, near the state border, was said to be showing oil and water from perforations at 3,334-53 ft. Total depth was 3,644 ft. Another rank wildcat test, also in northwestern Kansas, was Union Oil Co.'s 1 Pratt Ranch, NE NE SW 23-8-36w, in Thomas County. Operators were reported to be testing the Lansing-Kansas City lime after drilling to 4,444 ft in Arbuckle dolomite.

Important developments of the week centered in the Lindsborg area of McPherson County. Dickey Oil Co. 1 Frantz, W½ SE SE 24-17-4w, midway between Lindsborg and Southwest Lindsborg, drew a potential of 59 bbl. of oil a day to connect the two pools into one producing area some 4½ miles long. In the north end of the field, Carter Oil Co. completed its 2 A. W. Carlson, NE NW 7-17-3w, for 119 bbl. of oil daily in Viola lime at 3,396-3,405 ft.

The Dayton Lansing-Kansas lime pool of Phillips County continued its narrow north and south trend with the addition of 3 wells the past week, one on the south and two extending the north end. Tom Allan et al 1 and 2 Kaiser pumped 75 and 350 bbl. potentials. The 350-bbl. well is offset on the west and the smaller well extended the field ¼ mile. The south well was the same company's 2 Klotz, which pumped potential of 306 bbl. a day.

Two comparatively large wells were added to the Hendrickson area of the Peace Creek pool in Reno County. Cities Service Oil Co. and Lion Oil Refining Co. 1 and 2 Wiederoder pumped 225 bbl. in 15 hours and 297 bbl. in 24 hours, respectively in the Viola lime. The two wells broaden the field on its eastern side.

KANSAS COMPLETIONS

Wildcats

Ellis County: Falcon-Seaboard 1 Penny Wann, N½ NW NW 14-15-20w, dry, T.D. 3,861 ft., Lansing 3,388 ft., conglomerate 3,728 ft., pre-Cambrian 3,859 ft.

McPherson County: Westgate-Greenland 1 Ingemanson, W½ SW SW 2-17-5w, dry, T.D. 3,685 ft., Lansing 2,500 ft., Mississippi lime 3,152 ft., Kinderhook 3,360 ft., Viola 3,608 ft., Simpson 3,670 ft.

Rooks County: Harbor Drlg. 1 Shaw, SE SE SE 36-8-20w, dry, T.D. 3,715 ft., Topeka 3,050 ft., Lansing 3,259 ft., conglomerate 3,498 ft., Arbuckle 3,676 ft.

Fields

Beaumont, Greenwood County: K. T. Wiedemann 2 Edgar, NW NE SW 2-28-8e, dry, T.D. 2,611 ft., Mississippi lime 2,569 ft.

Beaver, Northwest, Barton County: Transwestern Oil 1 Depiesse, S½ SW SE 6-16-12w, pumped 171 bbl., Topeka 2,876-81 ft., T.D. 3,319 ft.

Dayton, Phillips County: Tom Allen 2 Klotz, SW SW 1-3-19w, pumped 306 bbl., Lansing 3,170-3,219 ft.

Tom Allan and Co-Operative 2 Kaiser, NW SW 25-2-19w, pumped 75 bbl., Kansas City 3,366-3,422 ft., T.D. 3,440 ft.

Tom Allen 1 Kaiser, SW SW 25-2-19w, pumped 350 bbl., Lansing 3,221-3,335 ft.

Dorr, Rooks County: Cities Service 1 Crawford, SW SW 16-9-16w, pumped 156 bbl., Lansing 3,305-13 ft., 3,382-90 ft., T.D. 3,525 ft.

Eberhardt, Barton County: Vickers Pet. 2-C Herr, N½ SE SE 24-19-11w, pumped 387 bbl., Arbuckle 3,318-41 ft.

Cities Service 116 Hegberg, NE NW NE 28-25-5e, pumped 30 bbl., Kansas City 1,988-2,032 ft., T.D. 2,250 ft.

Greenvale, Russell County: Magnolia 1 J. M. Trapp, SE SE NE 31-14-12w, pumped 279 bbl., Arbuckle 3,173-76 ft.

Kraft-Prusa, Barton County: Gulf 2 Kroutwurst, NE NW SE 9-17-11w, dry, T.D. 3,330 ft., Arbuckle 3,322 ft.

Lauck-Moncrief 2 Oeser, NE SW SE 25-16-12w, pumped 160 bbl., Topeka 2,895-2,907 ft., T.D. 3,393 ft.

Leesburg, Stafford County: Continental and Cities Service 2 Russell, NW NE SE 13-25-13w, salt water disposal well, T.D. 4,409 ft., Lamotte sand 4,370 ft.

Lindsborg, McPherson County: Carter Oil 2 A. W. Carlson, NE NW 7-17-3w, pumped 119 bbl., Viola 3,396-3,405 ft.

Lost Springs, Marion County: Ring-Mac Oil 3 Henke, W½ NE NE 4-18-4e, pumped 153 bbl., Mississippi lime 2,356-83 ft.

Ring-Mac Oil 4 Novak, SW NE 32-17-4e, dry, T.D. 2,427 ft., Mississippi lime 2,393 ft.

McLouth, Leavenworth County: McLaughlin 2 Borst, SE SE NE 1-10-20e, dry, T.D. 1,474 ft., Mississippi lime 1,471 ft.

McLough, Jefferson County: Fisk-Hatcher 1 Black, NE NE 29-9-20e, dry, T.D. 1,473 ft., sand 1,462 ft., filled 200 ft. with oil.

Neidenthal, Russell County: Lario Oil & Gas 4 Boxberger, NE NW 24-14-15w, dry, T.D. 3,231 ft., Arbuckle 3,221 ft.

Peace Creek, Reno County: Cities Service and Lion 2 Wiederoder, SW SE SW 12-23-10w, pumped 297 bbl., Viola 3,753-64 ft.

Cities Service and Lion 1 Wiederoder, SW NE SW 12-23-10w, pumped 225 bbl. in 15 hr., Viola 3,739-53 ft.

Raymond, Rice County: Herndon Drlg. 2 Lola, SW SE 19-20-10w, pumped 413 bbl., Arbuckle 3,297-99 ft.

Stoltenberg, Ellsworth County: H. V. Elwell 1 Lanzl, E½ NW SE 20-16-10w, pumped 197 bbl., Arbuckle 3,327-3,333 ft.

Virgil, Greenwood County: Aikman & Braden 2 Flemming, NE NE 15-24-12e, pumped 8 bbl., Mississippi lime 1,720-70 ft.

NEBRASKA

ST. JOSEPH, Mo.—Ferguson and Edwin S. Towle 1 Della Ehbauer has been started in NW NW NE 2-2n-15e, Richardson County, Nebraska. This is a farmout from Magnolia Petroleum Co., 2 miles northeast of Verdon and ½ mile northeast of the old I.T.I.O. 1 Bankers Life.

In the McLouth, Kans., area, O. J. Connell in C E½ NE NE 28-9s-20e, Jefferson County, set 10-in. pipe at 25 ft. and was drilling at 680 ft. Apperson 3 Bower was drilling at 845 ft. in SE NE NE 5-10s-20e.

The McLaughlin 2 Borst in SE NE 1-10s-20e, Leavenworth County, Kansas, was a dry hole. There was no McLouth sand. Mississippi lime was topped at 1,471 ft. and drilled to 1,474 ft.

OHIO, INDIANA

Sandyville Field Extended Two Miles Northward

ZANESVILLE, Ohio.—Another wildcat producer, gaging 1,000,000 cu. ft. of gas, has been completed in the north extension of the Sandyville field. The well, 2 miles from the nearest producer, was drilled by Fry et al on the Bradley and Doner tract in Section 8, Pike Township, Stark County. The sand was found at 4,664-88 ft.

The Wellington pool was extended ½ mile to the southwest by the completion of the Glen Harman 1 M. E. Holmes, Lot 2, Huntington Township.

Ohio Fuel Gas Co. 1 C. R. Ringer, Section 25, Liberty Township, extended the Wheeling pool ½ mile to the south.

OHIO COMPLETIONS

Athens County, Carthage Township: Westova 1 Mary B. Stout, Sec. 32, Berea, 1,000,000 cu. ft. and 5 bbl., T.D. 1,725 ft.

Guernsey County, Liberty Township: Ohio Fuel 1 C. R. Ringer, Sec. 25, Oriskany 1,070,000 cu. ft., T.D. 3,280 ft.

Richland Township: R. M. Burns, 7 M.W. C.D., Lot 13, shale, 8 bbl., T.D. 420 ft.

Lorain County, Huntington Township: Glen Harmon 1 M. E. Holmes, Lot 2, 1,142,000 cu. ft., T.D. 2,432 ft.

Medina County, Hinckley Township: William Dempsey 1 R. M. Gates, Lot 45, Clinton, 14 bbl., T.D. 3,316 ft.

Morgan County, Bloom Township: Industrial Gas 1 James & Barr, Sec. 4, Clinton, dry, T.D. 4,473 ft.

Muskingum County, Blue Rock Township: Industrial Gas 2 Frank Mitchell, Sec. 9, Clinton, 1,330,000 cu. ft., T.D. 4,438 ft.

Perry Township: Ohio Fuel 1 T. S. Lighthizer, third qr., Clinton, dry, T.D. 4,113 ft.

Noble County, Enoch Township: G. M. Harper 10 T. S. Crum, Sec. 27, Stray, dry, T.D. 640 ft.

Perry County, Reading Township: Pure Oil Co. 1 Erman Brown, Sec. 1, Clinton, 27 bbl., T.D. 3,268 ft.

Industrial Gas 1 Steiner and Fleer, Sec. 22, Berea, 554,000 cu. ft., T.D. 911 ft.

Stark County, Pike Township: Fry et al 1 Bradley and Doner, Sec. 8, Clinton, 1,000,000 cu.. ft., T.D. 4,695 ft.

Tuscarawas County, Lawrence Township: Ohio Fuel 1 Howard Stone, Lot 92, Clinton, dry, T.D. 4,827 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Eastern Kentucky's drilling operations continued on an even course this week with a

(Continued on Page 92)

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NORTH LOUISIANA

Bossier Parish Wildcat May Open New Petit Pool

SHREVEPORT, La.—Although complete details were lacking, another new Petit lime pool was in prospect for Bossier Parish. Hunt Oil Co. 1 Pardee in Section 16-23n-11w, drilled to 6,083 ft., casing was perforated at 5,942-63 ft. with 115 shots, acidized with 5,000 gallons and swabbed for 48 hours, recovering mostly salt water. Perforations will be made at a lower depth. Previously, the well was reported as having oil in the hole after landing casing near the 5,000-ft. mark. Location is about 3 miles southeast of the North Carterville pool.

A third producer for the North Carterville pool was brought in by Hunt Oil Co., discoverer and sole operator in the field. It was 1 Oglee and was said to be flowing more than 100 bbl. a day from perforations in the lime at 6,046-6,140 ft. Two other wells in the pool were drilling.

The California Co.'s 6 D. V. Applegate in the Lake St. John pool of Concordia Parish had trouble with water encroaching but was completed for initial potential of 116 bbl. of fluid. Pay sand was 3,400-30 ft. Perforations at 3,421-25 ft. swabbed 5 bbl. an hour of dead oil. Additional holes at 3,405-13 ft. increased the dead oil and recovered 7 bbl. of oil and mud. These perforations were squeezed. Additional perforations from 3,397-3,428 ft. tested up to 80 per cent salt water. The well made its potential after reperforating at 3,400-07 ft. with 24 shots. Tubing pressure was 325 lb. and total depth was 4,390 ft.

NORTH LOUISIANA COMPLETIONS

Wildcats

Natchitoches Parish: Bayou Pierre Oil Co. 1 B. L. Brown, Sec. 25-10n-8w, dry, T.D. 1,505 ft., Midway 1,197 ft.

Union Parish: Hunt Oil 1 Frost, SW NE 18-23n-1e, dry, T.D. 8,169 ft., Cotton Valley 5,270 ft., Smackover 8,076 ft.

Winn Parish: H. L. Hunt F-24 Goodpine, reworked, SW SE 13-12n-5w, flowed 100 bbl. distillate through choke, tubing pressure 2,000 lb., T.D. 9,179 ft.

Fields

Caddo-Pine Island, Caddo Parish: Bayou State Oil Corp. 1 Bussa, SE NE SE 17-21n-15w, dry, T.D. 1,145 ft.

Carterville, N., Bossier Parish: Hunt Oil Co. 2 Nebo, SW SW 3-23n-12w, flowed 238 bbl. a day through 24/64-in. choke, 10 per cent water, 39-gravity, perf. 6,064-6,146 ft., acidized, T.D. 6,320 ft.

Lake St. John, Concordia Parish: California Co. 6 D. V. Applegate, Sec. 14-9n-10e, flowed 116 bbl. in 24 hr. through choke with considerable water, perf. 3,397-3,428 ft., T.D. 4,594 ft.

Pine Island, Caddo Parish: Magnolia 46 Doan-Thigpen, N½ SW SE 6-20n-15w, flowed 125 bbl. through open 2-in., T.D. 1,525 ft.

Sugar Creek, Claiborne Parish: Carter Oil 3 Stevenson-Kilpatrick, SW NW 12-19n-

(Continued on Page 92)

OKLAHOMA

East Watchorn Pool Is Extended Into Osage County

A NORTH extension of the East Watchorn pool of Pawnee County, across the Arkansas River and into Osage County, was assured last week when the Continental Oil Co. 1 Osage, SW NW 24-23n-3e, cored saturated sand at 3,813-33 ft., approximately the same level as producing wells to the south, and set pipe for production tests. The Osage Agency at Pawhuska predicted a rapid expansion for the pool in that county. Champlin Refining Co. has the west offset location to the new Osage County well.

Bradley Brothers 1 Echols, SW SW SW 21-6n-8e, a wildcat in the old Konawa area of Seminole County, was shut in for connections after swabbing 160 bbl. of oil in 15½ hours. Five-inch casing was set at 2,636 ft., the hole drilled out to 2,658 ft. and shot with 25 qt. at 2,639-58 ft. Pay is the Booch sand topped at 2,636 ft.

In Pittsburg County a second gas well was added to the old South Canadian pas pool, where in 1915 a small gas well was completed in sand at 1,920-2,120 ft. The second well, M. M. Schene 1 Schudel, SW SW NE 1-6n-15e, found the Hartshorne sand at 1,958-2,188 ft. and had total depth at 2,204 ft. Before shooting it flowed 400,000 cu. ft. of gas and after the shot gaged a little over 3,000,000 cu. ft.

An extension well on the southwest side of the Cement pool of Caddo County was reported to have nearly 100 ft. of saturated sand near the bottom where perforations had been made, but no confirmation or details had been given out late last week. The well, Ray Stephens, Inc., 1 Piersen, SE SW SE 35-6n-10w, was drilled to 5,753 ft. and casing was set on bottom. After swabbing to bottom, the well was said to be flowing oil, with some load water and mud, into the pits. Further testing is under way. Four miles west of the 1 Piersen, Amerada Petroleum Corp. 1 Cliff, a wildcat in NW SW NE 30-6n-10w, was drilling ahead at 6,757 ft. Shows of oil were reported in sand at 2,228 ft., in dolomite at 3,440 ft. and in sand at 3,470 ft.

Included in the first reports for the week was the Texas Co. 1 Cline, NW NE 8-3n-10w, which was granted an exception to gas-well spacing and additional wells will be one to each 80 acres. Location is 9 miles north of the Lawton pool and 3 miles southeast of Elgin. Some gas has previously been found in this area. At last report it was drilling below 1,000 ft.

Amerada et al were building roads for their communitized Simpson test at 1 Neff-Godfrey in SE NW SW 22-6s-7e, about 8 miles south of Cumberland and east of Oil Creek in Bryan County.

OKLAHOMA COMPLETIONS

Wildcats

Lincoln County: Magnolia 1 Knack, NW NE 7-13n-3e, dry, T.D. 5,336 ft., Layton 3,380 ft., Prue 4,347 ft., Bartlesville 4,740 ft., Misener 4,994 ft., Hunton 4,996 ft., Wilcox 5,237 ft., second Wilcox 5,306 ft.

Okmulgee County: Seismograph Service 1 Thompson, N½ N½ NE 19-15n-11e, dry, T.D. 3,158 ft., Dutcher sand 2,600 ft., Viola 3,090 ft., Wilcox 3,132 ft., at T.D. had 1,000 ft. of oil in the hole and 700 ft. water, shot 3,130-55 ft. and pumped 13 bbl. of oil and 60 bbl. water.

Payne County: Stanolind-Amerada 1 Ingham, SW NW SE 28-20n-4e, flowed 230 bbl. in 19 hr., Misener 4,027-48 ft., T.D. 4,156 ft., gravity 43.4.

Pittsburg County, S. Canadian gas area: M. M. Schene 1 Schudel, SE SW NE 1-6n-15e, 3,000,000 cu. ft. gas, sand 1,958-2,188 ft., T.D. 2,204 ft., shot 1,958-2,188 ft.

Seminole County, W. of Cromwell: Jones Associated 1 Cappedge, SW SW SW 8-10n-8e, dry, T.D. 3,728 ft., Bartlesville 2,913 ft., show oil, Misener 3,564 ft., Viola 3,643 ft., Wilcox 3,672 ft., second Wilcox 3,695 ft.

Fields

Big Pond, Creek County: Mealy-Wolf 1 Watson, SE SW NE 3-14n-7e, 2,339,000 cu. ft. gas, Bartlesville 3,093-3,113 ft., 375 lb. R.P.

Glenn Pool, Creek County: Sinclair Prairie 41 Berryhill, SW NE NW 16-17n-12e, repressure well, T.D. 1,548 ft., sand 1,387-1,547 ft.

Hewitt, W. Carter County: H. F. Gibson 13 Griffin, SE NW SE 20-4s-2w, pumped 214 bbl., sand 2,530-55 ft., T.D. 2,605 ft.

Loco, Stephens County: Phillips 1 Baker, SW SW NW 36-2s-6w, pumped 4 bbl. in 5 hr., sand 1,540-60 ft., T.D. 1,841 ft.

Sinclair Prairie 1 Stanley, SW SW SW 5-3s-5w, pumped 8 bbl., sand 1,092-1,115 ft., T.D. 1,255 ft.

Brown & Lantz 3 Lowery, SE SW NW 8-3s-5w, pumped 40 bbl., sandy lime 1,060-1,122 ft., T.D. 1,150 ft.

Midwest, Okfuskee County: Portable Drlg. 1 Johnson, SE SE SW 19-11n-10e, flowed 100 bbl., Hunton 3,680-84 ft., T.D. 3,749 ft.

Velma, Stephens County: Gulf 2 Spears, SW NW SW 14-1s-5w, dry, T.D. 3,060 ft.

Skelly 1 McCasland, NW SE SE 36-1s-5w, pumped 35 bbl., sand 790-812 ft.

Miscellaneous

Marshall County: Roy I. Carter 1-A Bennett, W½ SE SW 33-5n-5e, dry, T.D. 1,910 ft.

Okfuskee County: W. A. Fleming 2-A Robinson, SE SW SW 1-10n-11e, dry, T.D. 3,100 ft., Cromwell 2,942 ft.

Okmulgee County: J. R. Parks 1-A Carter, NE NW 5-13n-15e, dry, T.D. 2,000 ft.

Osage County: Peters Pet. No. 2, SW NE NE 15-22n-10e, dry, T.D. 2,135 ft.

Sinclair Prairie No. 67, SW NE NE 19-23n-12e, pumped 10 bbl., sand 1,624-83 ft.

Seminole County: Blackwell Oil & Gas 2 Fleet-Osborne, SW NE NE 12-5n-6e, 2,000,000 cu. ft. gas, sand 1,929-42 ft., T.D. 1,946 ft.

Illinois Fields

(Continued from Page 81)

1 J. P. Gillison, SE SW 2-1s-8e, pumped 74 bbl., shot 2,992-3,007 ft., Aux Vases sand 2,978-96 ft., T.D. 3,110 ft.

New Harmony, White County: Mabee Drlg. 10 O. Smith, NW SE SW 4-4s-14w, pumped 38 bbl., shot 2,560-67 ft., 2,799-2,823 ft., Cypress sand 2,557-67 ft., Aux Vases sand 2,798-2,823 ft., T.D. 2,823 ft.

Noble, Richland County: Pure 1 Harrell Consol, SE NE SW 26-4n-9e, pumped 68 bbl., shot 2,574-82 ft., Weiler 2,569-82 ft., T.D. 2,582 ft.

Pure 35 Coen, E½ 4-3n-9e, pumped 352 bbl., natural, Weiler 2,589-2,600 ft., T.D. 2,600 ft.

North Boos, Jasper County: Carter 3 Resch, SW SE 17-6n-10e, flowed 431 bbl., acidized, McClosky 2,805-09 ft., 2,819-25 ft., T.D. 2,845 ft.

Patton, Wabash County: Caudell et al 1-C Price est., NW NE SW 23-1n-12w, pumped 65 bbl., pay 1,069-81 ft., T. D. 1,081 ft.

Roland, White County: Carter 1 George Cange, SW NE 2-7s-8e, dry at 2,988 ft., Menard 2,150 ft., Vienna 2,287 ft., Tar Springs sand 2,344 ft., Glen Dean 2,412 ft., Cypress sand 2,686 ft., Benoist sand 2,816 ft., Aux Vases sand 2,933 ft.

Rural Hill, Hamilton County: Texas 3 Hunt, NW NW SW 7-6s-6e, pumped 101 bbl., shot 3,096-3,111 ft., Aux Vases sand 3,090 ft., T.D. 3,111 ft.

Shell 3 Hungate, W½ NE SW SW 24-6s-5e, pumped 47 bbl., shot 3,114-28 ft., Aux Vases sand 3,106-24 ft., T.D. 3,138 ft.

Russellville, Lawrence County: Kentucky Nat. Gas 1 Thompson, S½ SW NW 18-4n-10w, 2,500,000 cu. ft. gas, T.D. 813 ft.

St Jacob, Madison County: Bryant & Obering 1 Mueller, SW SE NE 16-3n-6w, pumped 230 bbl., Trenton 2,367-74 ft., 2,378-83 ft.

Salem, Marion County: Texas 1 L. Blenz., NE NW SE 16-1n-2e, pumped 69 bbl., acidized, McClosky 2,107-13 ft., T. D. 2,120 ft.

Sesser, Franklin County: Eslick et al 2 H. Swain, NW SE NW 18-5s-2e, dry at 2,751 ft., Golconda 2,315 ft., Barlow 2,460 ft., Weiler 2,495 ft., Paint Creek 2,580 ft., Benoist sand 2,671 ft. Aux Vases sand 2,740 ft.

South Lawrence, Lawrence County: Smith & Nye 1 Spidel Consol., NW SW SE 23-2n-12w, pumped 250 bbl., natural, Biehl 1,360-74 ft., 1,375-90 ft., T.D. 1,390 ft.

S. Maylis 2 T. C. Potts, NE NE SW 26-2n-12w, pumped 120 bbl., shot 1,345-1,403 ft., Biehl 1,345-69 ft., 1,377-1,403 ft., T.D. 1,405 ft.

Walpole, Hamilton County: Perrine-Pearson 1-A Lee, SW NE NW 27-6s-6e, pumped 297 bbl., shot 3,072-97 ft., Aux Vases sand 3,063 ft., T.D. 3,099 ft.

West Inman, Gallatin County: Skelly 2 Schmidt, SE NW NW 15-8s-9e, pumped 60 bbl., shot 2,520-30 ft., Cypress sand 2,516-30 ft., T.D. 2,574 ft.

Appalachian Fields

(Continued from Page 78)

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Kittanning Township: Equitable Gas Co. 1 L. Egley, 84,000 cu. ft. gas, Murraysville sand 1,160-98 ft., gas 1,184 ft. and 1,189 ft., T.D. 2,902 ft.

Greene County, Cumberland Township: Greensboro Gas Co. 1 Thomas Patterson, 231,000 cu. ft. gas, Elizabeth sand 2,907-20 ft., gas 2,910 ft., T.D. 2,969 ft.

CANADIAN FIELDS

Test in Vauxhall Area Encounters Oil Showing

CHATHAM, Ont.—Crude petroleum and natural-gasoline production from all Alberta fields for the week ending February 15 averaged 27,399 bbl. daily, compared with 26,596 bbl. daily for the previous week and 29,804 bbl. daily for the corresponding week last year. The daily average included 26,002 bbl. of crude petroleum and 1,113 bbl. of natural gasoline from Turner Valley and 284 bbl. of crude from outside fields. The total of producing oil wells is given as 196 for Turner Valley and 30 for outside fields, the Turner Valley total being reduced by the transfer of 10 of the older South Turner Valley wells to the gas-well category.

Vauxhall Oil Strike

In the Vauxhall area of southeastern Alberta, Imperial-Armelgra 1, LSD 16, 19-13-13w4, got the lime at 3,175 ft. and was drilled to 3,180 ft. A substantial showing of 17-gravity oil was encountered at the lime contact. In a short time the oil rose 1,400 ft. in the hole. The well started bailing at a rate of 29 bbl. in 8 hours, or around 87 bbl. a day, later settling to about 30 bbl. a day. It is being gun-perforated and acidized, and production tests are continuing. The well is located in wildcat territory, about 25 miles east of Vauxhall, and 50 miles northeast of Taber. The crude is encountered in the same horizon as the production in the Standard of British Columbia No. 1 discovery well south of Taber, and is slightly heavier than the Taber crude. Casing was set above the Ellis sad. The well was one of a series of outpost tests drilled by Imperial Oil some distance from the Tilley field, and is the first of these tests to get production.

Vermilion Drilling

In the Vermilion field, eastern Alberta, Cannar Oils, subsidiary of the Canadian National Railways, has let contracts for the first 10 wells of its 50-well program. Contracts for five wells have been let to William G. de Koch & Co. and five to Brooks-Alberta Co., the entire 10 wells to be serviced by General Petroleums. Cannar Oils is opening offices at Vermilion and unloading casing and equipment, in preparation for drilling which is to start by April 1. The first wells are to be drilled in proven territory, centering in E½ Section 30-50-5w4, close to Borrodaile Station on the C.N.R. and spacing will be on a 10-acre basis.

Turner Valley in 1942

The 29 wells completed and brought into production in Turner Valley in 1942 produced 1,793,571 bbl. of crude oil up to the end of the year. Six of the wells produced over 10,000 bbl. each, these being Atlas-British Dominion 2, Foothills 12, Home Oil 11, Major Oils 4 and 7 and Miracle Oils 2. Most of the completions were in North Turner Valley, with the largest producers in the north extension in Township 21.

Walton Creek Test

The federal government at Ottawa has undertaken to grant special tax assistance through depreciation allowances to Home Oil Co. and Anglo-Canadian Oil Co. for a joint test to be drilled this year on the Walton Creek structure in Alberta. The estimated cost of the test is $200,000 and work is to start by March 15. The area is in the Alberta foothills about 65 miles northwest of Calgary, and immediately south of Grease Creek, where a deep test a couple of years ago encountered encouraging oil showings but failed to develop commercial production.

Devonian Test Gets Marker

The important Devonian Test 1, LSD 2, 25-19-3w5, in South Turner Valley, got the Blairmore contact at 5,730 ft. and is deepening below 6,120 ft. It is expected to get the Madison limestone at normal depth, but will be continued down to test the underlying Devonian formation, which has never been penetrated in Turner Valley. The test, estimated to cost $250,000, is being jointly sponsored by a group of Turner Valley companies, with Royalite Oil Co. taking a major share in the enterprise.

Sullivan Creek Well

Encouraging conditions have been encountered in the joint Sullivan Creek Syndicate test, LSD 13, 25-17-5w5, which is in the Kootenay formation just below 890 ft. Eight Turner Valley companies are participating in the test, which is located on a structure about 45 miles west of Longview which is near the extreme south end of Turner Valley. The Kootenay formation, here being drilled around 890 ft., is normally encountered in Turner Valley around 7,000 to 8,000 ft. so that the test should get the Madison limestone by comparatively shallow drilling, with the underlying Devonian formation within easy reach. The companies participating include Anglo Canadian Oil Co., Petroleum Corp., Sunset Oils, McDougall-Segur Exploration Co., Alberta Pacific Consolidated Oils, Anaconda Oil Co. and Highwood-Sarcee Oils.

Alberta Oil Regulations

Following conferences between the Alberta Conservation Board and representatives of the oil industry, a new drilling and production code for Alberta has been issued by Hon. N. E. Tanner, minister of lands and mines. The new code is a consolidation, with some minor revisions, of the existing regulations. A drilling permit, issued by the government on application to the Conservation Board, is required for each well, a $25 license fee being charged. The board is empowered to establish well spacing for various fields and has already established 40-acre spacing for Turner Valley, 10-acre for Vermilion and tentatively 40-acre spacing for the Taber field. Provision is made for regular drilling reports, with samples and cores, for production reports, and for the sealing off of gas and water; and abandonment or suspension of drilling can be carried out only with the board's approval and subject to specified safeguards. The board is empowered to shut off uncontrolled oil, gas or water flows at the operator's expense.

Imperial in Coalspur

Imperial Oil has taken out a reservation of 139,520 acres in the Coalspur area of the northern foothills, about 18 miles east and south of the extensive holdings now being tested by Shell Exploration Co. 1 Solomon Creek, in 17-51-27w5. The reservation is one of the largest yet blocked in Alberta. The area is north of the Coalspur-Lovett anticline where Imperial Oil drilled a couple of tests some years ago.

Saskatchewan Operations

Drilling operations for Oil Ventures, Ltd., in the Kamsack shallow field of eastern Saskatchewan will be handled by William and G. C. Hussey of Petrolia. The drilling program calls for a series of wells along the structure extending east from Kamsack toward the Manitoba boundary, and the shallow program contemplates an aggregate output this year of 3,000,000 cu. ft. daily from the shale horizon around 185 to 200 ft. depth. The immediate objective is to secure sufficient gas to operate an industrial alcohol plant at Kamsack. When a production of 1,000,000 cu. ft. daily is secured, a deep test will be started in the same area.

Ontario Drilling

In the Ontario fields, recent completions include three gassers with an aggregate output of 120,000 cu. ft. daily and two dry holes. In Westminster Township, Middlesex County, south of London, Union Gas 2, wildcat test, Lot 3, Concession 3, finished dry at 1,225 ft.

Prince Edward Island

Under the sponsorship of the Foundation Co. of Montreal, engineers are sounding in Hillsboro Bay, near Charlottetown, in Prince Edward Island, to secure a suitable location for a test for oil. Robert Griesbach is in charge of operations. Some drilling operations have previously been carried on in the province of Prince Edward Island, but so far without commercial results. The area is related geologically to the Stoney Creek field in New Brunswick, in which considerable gas production and some oil has been secured.

CRUDE PRICES

OKLAHOMA AND KANSAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 21	...	...	...	...	$.85	$.75	...
21-21.9	...	...	...	...	.87	.78	...
22-22.9	...	...	...	...	.89	.81	...
23-23.9	...	...	...	...	.91	.84	...
24-24.9	...	...	...	...	.93	.87	...
Below 25	$.92	...	...	$.86	...	...	...
25-25.9	.95	$.95	...	.88	.95	.90	...
26-26.9	.97	.97	...	.90	.97	.93	...
27-27.9	.99	.99	...	.92	.99	.96	...
28-28.9	1.01	1.01	$1.01	.94	1.01	.99	...
29-29.9	1.03	1.03	1.03	.96	1.03	1.02	...
30-30.9	1.05	1.05	1.05	.98	1.05	1.05	$1.05
31-31.9	1.07	1.07	1.07	1.00	1.07	1.07	1.07
32-32.9	1.09	1.09	1.09	1.02	1.09	1.09	1.09
33-33.9	1.11	1.11	1.11	1.04	1.11	1.11	1.11
34-34.9	1.13	1.13	1.13	1.06	1.13	1.13	1.13
35-35.9	1.15	1.15	1.15	1.08	1.15	1.15	1.15
36-36.9	1.17	1.17	1.17	1.10	1.17	1.17	1.17
37-37.9	1.19	1.19	1.19	1.12	1.19	1.19	1.19
38-38.9	1.21	1.21	1.21	1.14	1.21	1.21	1.21
39-39.9	1.23	1.23	1.23	1.16	1.23	1.23	1.23
40 and above	1.25	1.25	1.25	1.18	1.25	1.25	1.25

OKLAHOMA AND KANSAS TABLE EXPLANATION

Column 1 Mid-Continent grades:
Pure Oil Co., 5-20-41.
Gulf Oil Corp., 5-20-41.
Skelly Oil Co. (Kansas only), 5-19-41.
H. F. Wilcox Oil & Gas Co., 5-20-41.

Column 2 Mid-Continent grades:
White Eagle Oil Purchasing Co., Inc., 5-19-41, Kansas only.
Sinclair Prairie Oil Marketing Co., 5-20-41.

Column 3 Mid-Continent grades:
Continental Oil Co., 5-19-41.
Phillips Petroleum Co., 5-19-41.
Tide Water Associated Oil Co., 5-20-41.

Column 4 Jackson and Tillman counties:
Gulf Oil Corp., 5-20-41.

Column 5 Mid-Continent grades:
Standard Oil Co. (Indiana), 5-20-41.
National Refining Co., 5-20-41.

Column 6 Mid-Continent grades:
Magnolia Petroleum Co., 5-21-41.
Shell Oil Co., Inc., 5-19-41.
Shell, in Carter County, 12-5-41.
Ben Franklin Refining Co., 12-4-41.
Carter Oil Co. (Oklahoma only), 5-19-41.

Column 7 Oklahoma:
Champlin Refining Co., 5-20-41.

OKLAHOMA FLAT PRICE

Cumberland	$1.14

Pure Oil Co., 9-4-41.

LOUISIANA AND SOUTHERN ARKANSAS TABLE EXPLANATION

Standard Oil Co. of Louisiana, 5-22-41.

Column 1 applies to Atlanta, Buckner, Magnolia, Schuler (Jones sand), Village, and Lewisville fields.

Column 2 applies to De Soto, Sabine, Fouke, Homer, Miller County, Sugar Creek, and Nebo.

Column 3 applies to Little Creek, Olla, and South Olla (4-3-43).

Column 4 applies to Bayou Mallet, Choctaw, Darrow, Jeanerette, Lirette, North Crowley, South Crowley, Port Barre, Potash, Roanoke, St. Martinville, and Port Allen.

Column 5 applies to University (Baton Rouge). Posted 6-2-42.

Column 6 applies to Cotton Valley crude, Rodessa and Shreveport (Cross Lake); also Anse La Butte, effective 8-1-41, starting at 80 cents for below 21°, also to Caddo effective 10-15-41.

Continental Oil Co., 5-21-41.

Column 7 applies to Abbeville, Louisiana.

Stanolind Oil & Gas Co., 5-21-41.

Column 8 applies to East and West Hackberry.

Column 9 applies to Evangeline, Acadia Parish.

Lion Oil Refining Co., 5-22.41.

Column 1 applies to Reynolds lime, Jones sand, Schuler, Ark.

Column 2 applies to El Dorado, West and South Rainbow fields, Snow Hill, and Schuler-Morgan sand.

Placid Oil Co., 5-22-41.

Column 3 applies to Olla.

Column 2 applies to Nebo field.

Shell Oil Co., Inc., 5-20-41.

Column 10 applies to Roanoke, Chalkley.

Column 11 applies to Iowa, Black Bayou, White Castle.

Column 12 applies to Gibson, South Houma, Hester, West Lake Verret.

Magnolia Petroleum Co., 5-21-41.

Column 13 applies to Lockport, Cameron Meadows, and West Gueydan, La.

Column 8 applies to Haynesville, Cotton Valley, Rodessa, La., and Miller County, Arkansas.

Phillips Petroleum Co., 3-29-41.

Arkansas Fuel Oil Co., 2-19-42.

Column 1, Schuler (Jones sand), except schedule starts at 76 cents for below 25° gravity.

Gulf Refining Co., 5-21-41.

Column 9, Jennings.

Column 8, Edgerly, Starks, Vinton, East Hackberry, Cameron Meadows, and Leesville.

Column 16 applies to Grand Bay, Quarantine Bay, Timbalier Bay, and West Bay, except schedule starts at $1.12 for below 28° gravity.

Column 6 applies to Caddo, Homer, Bull Bayou, Crichton, De Soto, Haynesville, and El Dorado.

Column 4 applies to West Gueydan, effective 5-25-42.

Pure Oil Co., 4-22-41.

Column 14 applies to Gueydan crude.

Column 6, Caddo, Homer, Haynesville, Bull Bayou, Crichton, De Soto, and El Dorado.

Texas Co., 5-21-41.

Column 6 applies to North Louisiana.

Columns 15 and 16, Bay St. Elaine, Caillou Island, Iberia, Lake Barre, Lake Pelto, Leesville, Port Barre. (Schedules A and B).

Column 17, Bateman Lake, Dog Lake, Fausse Point, Horseshoe Bayou, Jefferson Island, Plumb Bob, Vermilion Bay, West Cote Blanche, and Delta Duck Club.

Column 18, Delta Farm, Lake Salvador, Golden Meadow.

LOUISIANA AND ARKANSAS FLAT PRICES

Continental Oil Co., 5-21-41:	
Tepetate and Lake Arthur	$1.18
Ville Platte	1.20
Gulf Refining Co., 5-21-41:	
Smackover (Ark.)	$0.83
Lion Oil Refining Co., 5-22-41:	
Smackover (heavy)	.83
Dorcheat	1.15
Phillips Petroleum Co., 5-22-41:	
Smackover (heavy)	$0.83
Placid Oil Co., 5-22-41:	
Tullos-Urania (5-21-41)	$1.15
Cotton Valley dist. (above 60°)	1.30
Cotton Valley (Holloway sand)	1.25
Cotton Valley (Bodcaw-D sands)	1.20
Pure Oil Co.:	
Bosco (5-21-41)	$1.14
Sweet Lake (5-22-41)	1.06
Creole (5-22-41)	1.16
Republic Oil Co., 6-2-41:	
Nevada County, Arkansas	$0.80
Republic Oil Refining Co., 5-21-41:	
Bayou Pigeon	$1.20
Shell Oil Co., Inc., 5-20-41:	
Happytown	$1.15
Standard Oil Co. of Louisiana, 5-22-41:	
Big Creek, Dorcheat, McKamie, Columbia, Macedonia (sour) (2-3-43)	$1.25
Smackover (heavy)	.83
Cotton Valley distillate (9-1-41)	1.40
Cotton Valley (Holloway sand)	1.25

LOUISIANA AND SOUTHERN ARKANSAS GRAVITY TABLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Below 18	...	...	...	...	...	...	...	...	...	...	...	...	$.94	...	...	...	...	...
18-18.9	...	...	...	...	...	...	...	...	...	...	...	...	.96	...	...	...	...	...
19-19.9	...	...	...	...	...	...	...	...	...	...	...	...	.98	...	...	...	...	...
Below 20	...	...	...	...	...	...	...	$1.06	...	$.94	$.99	$.89	...	...	$1.06	...	...	...
20-20.9	...	...	...	...	...	...	...	1.08	...	.96	1.01	.91	1.00	...	1.08	...	...	...
Below 21	$.68	...	...	$.90	...	...	...	...	...	...	...	...	...	$.90	...	...	...	...
21-21.9	.70	...	...	.92	...	...	...	1.10	...	.98	1.03	.93	1.02	.92	1.10	...	...	...
22-22.9	.72	...	...	.94	...	...	...	1.12	...	1.00	1.05	.95	1.05	.94	1.12	...	...	...
23-23.9	.74	...	...	.97	...	...	...	1.14	...	1.02	1.07	.97	1.08	.96	1.14	...	...	...
24-24.9	.76	...	...	.98	...	...	...	1.16	...	1.04	1.09	.99	1.11	.98	1.16	...	...	...
Below 25	...	$.86	$1.03	...	...	$.88	...	...	...	...	...	...	...	...	...	...	...	...
25-25.9	.78	.88	1.05	1.00	...	.90	...	1.18	...	1.06	1.11	1.01	1.14	1.00	1.18	...	...	...
26-26.9	.80	.90	1.07	1.02	...	.92	...	1.20	...	1.08	1.13	1.03	1.17	1.02	1.20	...	...	...
27-27.9	.82	.92	1.09	1.04	...	.94	...	1.22	...	1.10	1.15	1.05	1.19	1.04	1.22	...	...	...
28-28.9	.84	.94	1.11	1.06	...	.96	...	1.24	...	1.12	1.17	1.07	1.21	1.06	...	$1.14	$1.06	...
29-29.9	.86	.96	1.13	1.08	...	.98	...	1.26	...	1.14	1.19	1.09	1.23	1.08	...	1.16	1.08	...
30-30.9	.88	.98	1.15	1.10	$1.28	1.00	...	1.28	...	1.16	1.21	1.11	1.25	1.10	...	1.18	1.10	$1.05
31-31.9	.90	1.00	1.17	1.12	1.30	1.02	...	1.30	$1.07	1.18	1.23	1.13	1.27	1.12	...	1.20	1.12	1.07
32-32.9	.92	1.02	1.19	1.14	1.32	1.04	...	1.32	1.09	1.20	1.25	1.15	1.29	1.14	...	1.22	1.14	1.09
33-33.9	.94	1.04	1.21	1.16	1.34	1.06	...	1.34	1.11	1.22	1.27	1.17	1.31	1.16	...	1.24	1.16	1.11
34-34.9	.96	1.06	1.23	1.18	1.36	1.08	...	1.36	1.13	1.24	1.29	1.19	1.33	1.18	...	1.26	1.18	1.13
35-35.9	.98	1.08	1.25	1.20	1.38	1.10	...	...	1.15	...	...	...	...	1.20	...	1.28	1.20	1.15
Below 36	...	...	...	...	...	...	$1.07	...	...	...	...	...	...	...	...	...	...	...
36-36.9	1.00	1.10	1.27	1.22	1.40	1.12	1.09	...	1.17	...	...	...	...	1.22	...	1.30	1.22	1.17
37-37.9	1.02	1.12	1.29	1.24	1.42	1.14	1.11	...	1.19	...	...	...	...	...	...	...	...	1.19
38-38.9	1.04	1.14	1.31	1.26	1.44	1.16	1.13	...	1.21	...	...	...	...	...	...	...	...	1.21
39-39.9	1.06	1.16	1.33	1.28	1.46	1.18	1.15	...	1.23	...	...	...	...	...	...	...	...	1.23
40 and above	1.08	1.18	1.35	1.30	1.48	1.20	1.17	...	1.25	...	...	...	...	...	...	...	...	1.25

Lisbon distillate	$1.20
Texas Co., 5-21-41:	
Erath	$1.21
Garden Island	1.36
Lafitte, Paradis	1.19
Lake Mongoulois	1.36

CANADIAN FIELDS

Imperial Oil, Ltd.:	
Petrolia, 11-6-39	$2.10
Oil Springs, 11-6-39	2.07
Bothwell, 11-6-39	2.10
Turner Valley, 7-16-41	$1.35-1.97

SOUTH TEXAS AND SOUTHWEST TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 20	$1.03	$1.08	$1.08	$.89	$1.03	$1.03	$1.08
20-20.9	1.05	1.10	1.10	.90	1.05	1.05	1.10
21-21.9	1.07	1.12	1.12	.91	1.07	1.07	1.12
22-22.9	1.09	1.14	1.14	.92	1.09	1.09	1.14
23-23.9	1.11	1.16	1.16	.93	1.11	1.11	1.16
24-24.9	1.13	1.18	1.18	.94	1.13	1.13	1.18
25-25.9	1.15	1.20	1.20	.95	1.15	1.15	1.20
26-26.9	1.17	1.22	1.22	.96	1.17	1.17	1.22
27-27.9	1.19	1.24	1.24	.97	....	1.19	1.24
28-28.9	1.21	1.26	1.26	.98	....	1.21	1.26
29-29.9	1.23	1.28	....	.99	....	....	1.28
30-30.9	1.25	1.30	....	1.00	....	....	1.30
31-31.9	1.27	1.32	....	1.01	....	....	1.32
32-32.9	1.29	1.34	....	1.02	....	....	1.34
33-33.9	1.31	1.36	....	1.03	....	....	1.36
34-34.9	1.33	1.38	....	1.04	....	....	1.38
35-35.9	1.35	1.40	....	1.05	....	....	1.40
36-36.9	1.37	1.42	....	1.06	....	....	....
37-37.9	1.39	1.44	....	1.07	....	....	....
38-38.9	1.41	1.46	....	1.08	....	....	....
39-39.9	1.43	1.48	....	1.09	....	....	....
40 and above	1.45	1.50	....	1.10	....	....	....

SOUTH TEXAS AND SOUTHWEST TEXAS TABLE EXPLANATION

Column 1 Mirando:
Humble Oil & Refining Co., 5-21-41, includes Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North and South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro.
Magnolia Petroleum Co., 5-21-41.
Continental Oil Co., 7-1-41, includes Hoffman, Government Wells (North and South), Lopez, Moco, Colmena, Seven Sisters, South Seven Sisters, Loma Novia, Conoco, Driscoll, O'Hern, Piedra Lumbre, and Taranchauas.
American Mineral Spirits Co., 5-21-41, includes Adami and Munson.
Republic Oil Refining Co., 5-21-41, includes Heyser field crude.

Column 2 Refugio:
Continental Oil Co., 7-1-41, includes Minnie Bock, Clara Driscoll, South Clara Driscoll, Driscoll Ranch, Orange Grove and Wade City.
Humble Oil & Refining Co., 5-21-41, includes East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth Saxet, Taft, and Tom O'Connor.
American Mineral Spirits Co., 5-21-41, includes Plymouth, Taft, and East White Point.

Column 3 Refugio:
Texas Co., 5-21-41, includes Greta, Saxet, and Taft.

Column 4 La Rosa:
American Mineral Spirits Co., 3-29-41.

Column 5 Duval-Mirando:
Sun Oil Co., 5-21-41.

Column 6 Duval-Mirando:
Texas Co., 5-21-41.

Column 7 Nueces County:
American Mineral Spirits Co., 5-21-41.
Republic Oil Refining Co., 5-21-41.

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7	8
Below 20	....	....	....	....	$0.86	....	....	....
20-20.9	....	....	....	....	.82	....	....	....
Below 21	....	....	....	....	....	$0.81	....	....
21-21.9	....	....	....	....	.84	.83	....	....
22-22.9	....	....	....	....	.86	.85	....	....
23-23.9	....	....	....	....	.88	.87	....	....
24-24.9	....	....	....	....	.90	.89	....	....
Below 25	....	....	$0.88	....	....	....	$0.89	$0.95
25-25.9	$0.91	....	.90	$0.97	.92	.91	.91	.97
26-26.9	.93	....	.92	.99	....	.93	.93	.99
27-27.9	.95	....	.94	1.01	....	.95	.95	1.01
28-28.9	.97	$0.97	.96	1.03	....	.97	.97	1.03
29-29.9	.99	.99	.98	1.05	....	.99	.99	1.05
30-30.9	1.01	1.01	1.00	1.07	....	1.01	1.01	1.07
31-31.9	1.03	1.03	1.02	1.09	....	1.03	1.03	1.09
32-32.9	1.05	1.05	1.04	1.11	....	1.05	1.05	1.11
33-33.9	1.07	1.07	1.06	1.13	....	1.07	1.07	1.13
34-34.9	1.09	1.09	1.08	1.15	....	1.09	1.09	1.15
35-35.9	1.11	1.11	1.10	1.17	....	1.11	1.11	1.17
36-36.9	1.13	1.13	1.12	1.19	....	1.13	1.13	1.19
37-37.9	1.15	1.15	1.14	1.21	....	1.15	1.15	1.21
38-38.9	1.17	1.17	1.16	1.23	....	1.17	1.17	1.23
39-39.9	1.19	1.19	1.18	1.25	....	1.19	1.19	1.25
40 and above	1.21	1.21	1.20	1.27	....	1.21	1.21	1.27

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS TABLE EXPLANATION

Column 1 West Central and North:
Humble Oil & Refining Co., 12-11-41, includes Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, and Throckmorton counties.
Panhandle Refining Co., 12-11-41, in Leuders area.
Gulf Refining Co., 12-11-41.
Sinclair Prairie Oil Marketing Co., 12-11-41.

Column 2 North Texas:
Continental Oil Co., 12-11-41.
Magnolia Petroleum Co., 12-11-41.
Panhandle Refining Co., 12-11-41.
Bell Oil & Gas Co., 12-11-41.
Texas Co., 12-11-41.

Column 3 East Central:
Magnolia Petroleum Co., 5-21-41, includes Cass, Panola, and Rodessa (Texas and Louisiana), and Miller County, Arkansas.
Gulf Refining Co., 5-21-41, includes Rodessa, Texas.

Column 4 East Central:
Humble Oil & Refining Co., 5-21-41, includes Anderson, Cherokee, Limestone, and Navarro counties and the Navarro Crossing field.

Column 5 East Central:
Humble Oil & Refining Co., 5-21-41, includes Hawkins field.

Column 6 North Texas:
Stanolind Oil Purchasing Co., 12-11-41.

Column 7 Fisher County:
Shell Oil Co., Inc., 12-11-41.

Column 8 Mexia:
Sinclair Prairie Oil Marketing Co., 5-30-41.

TEXAS FLAT-PRICE FIELDS

Agua Dulce (light), Benavides, Longhorn, Southland, and Sweden, 5-21-41	$1.35
Agua Dulce (heavy), 10-16-41	$1.25
Republic Oil Refining Co., 5-21-41.	
Alfred and Magnolia City	$1.35
Continental Oil Co., 5-21-41.	
Alice, Benavides (North Sweden), Ben Bolt, Clark-Muil, Sun, and Tom Graham	$1.35
Humble Oil & Refining Co., 5-21-41.	
Batson (new), Humble (35° and above), Fig Ridge, Hardin, Hull (25° and above), La Belle, North Dayton (25° and above), Seabreeze South China, West Orange, Willow Slough and Oyster Bayou	$1.25
Sun Oil Co., 5-21-41.	
Cass County	$1.20
Texas Co., 5-21-41.	
Cayuga, Anderson County	$0.90
Pan American Production Co., 5-21-41.	
Chapel Hill, Smith County:	
Crude distillate	$1.30
Crude oil	1.18
Chapel Hill Gas System, 11-7-41.	
Clay Creek, Washington County	$1.00
Sun Oil Co., 5-21-41.	
Cleveland, Liberty County	$1.26
Magnolia Petroleum Co., 5-21-41.	
Conroe, Montgomery County	$1.43
Humble Oil & Refining Co., 5-21-41.	
Tide Water Associated Oil Co., 5-21-41.	
Sun Oil Co., 5-21-41.	
Texas Co., 5-21-41.	
Cotton Lake (South)	$1.35
Sun Oil Co., 5-21-41:	
East Texas and Flag Lake*	$1.25
*Humble Oil & Refining Co., 5-21-41.	
Pan American Production Co., 5-21-41.	
Tide Water Associated Oil Co., 5-21-41.	
Gulf Refining Co., 5-21-41.	
Magnolia Petroleum Co., 5-21-41.	
Sinclair Prairie Oil Marketing, 5-21-41.	
Shell Oil Co., Inc., 5-20-41.	
Sun Oil Co., 5-21-41.	
Texas Co., 5-21-41.	
Stanolind Oil Purchasing Co.	
Esperson (35° and above), South Esperson	$1.30
Sun Oil Co., 5-21-41.	
Flour Bluff, East Flour Bluff	$1.33
Humble Oil & Refining Co., 5-21-41.	
Hockley and Cochran	$0.87
Texas Co., 5-21-41.	
Livingston and Mercy	$1.25
Shell Oil Co., Inc., 5-20-41.	
Long Lake	$1.23
Sinclair Prairie Oil Marketing, 5-21-41.	
Luby	$1.35
American Mineral Spirits Co., 5-21-41.	
Luling	$1.05
Magnolia Petroleum Co., 5-21-41.	
Lytton Springs	$1.17
Magnolia Petroleum Co., 5-21-41.	
Salt Flat, North Salt Flat, Darst Creek*, Hilbig, Clark, Carroll, and Zoborski	$1.41
Humble Oil & Refining Co., 5-21-41.	
Magnolia Petroleum Co., 5-21-41.	
*Texas Co., 5-21-41.	
Rincon (North), Sun, North Sun and Garcia	$1.35
Sun Oil Co., 5-21-41.	
Yturria	$1.45
Sun Oil Co., 3-19-42.	
Talco	$0.79
Humble Oil & Refining Co., 5-21-41.	
Magnolia Petroleum Co., 5-21-41.	
Tomball and Satsuma	$1.40
Humble Oil & Refining Co., 5-21-41.	
*Magnolia Petroleum Co., 5-21-41.	
Stanolind Oil Purchasing Co., 4-1-41.	
Van, Van Zandt County	$1.08
Humble Oil & Refining Co., 5-21-41.	
Pure Oil Co., 5-21-41.	
Yates (regular)	$0.95
Humble Oil & Refining Co., 5-21-41.	
Gulf Refining Co., 5-21-41.	
Shell Oil Co., Inc., 5-20-41.	
Yates (shallow)	$0.82
Shell Oil Co., Inc., 5-20-41.	

TEXAS GULF COAST GRAVITY TABLES

	(1)	(2)	(3)	(4)	(5)
Below 20	$1.06	$1.06	....	$0.98	$0.93
20-20.9	1.08	1.08	....	1.00	.95
Below 21	....	....	$1.08	....	....
21-21.9	1.10	1.10	1.10	1.02	.97
22-22.9	1.12	1.12	1.12	1.04	.99
23-23.9	1.14	1.14	1.14	1.06	1.01
24-24.9	1.16	1.16	1.16	1.08	1.03
25-25.9	1.18	1.18	1.18	1.10	1.05
26-26.9	1.20	1.20	1.20	1.12	1.07
27-27.9	1.22	1.22	1.22	1.14	1.09
28-28.9	1.24	1.24	1.24	1.16	1.11
29-29.9	1.26	1.26	1.26	1.18	1.13
30-30.9	1.28	1.28	1.28	1.20	1.15
31-31.9	1.30	1.30	1.30	1.22	1.17
32-32.9	1.32	1.32	1.32	1.24	1.19
33-33.9	1.34	1.34	1.34	1.26	1.21
34-34.9	1.36	1.36	1.36	1.28	1.23
35-35.9	1.38	....	1.38	1.30	1.25
36-36.9	1.40	....	1.40	1.32	1.27
37-37.9	1.42	....	1.42	1.34	1.29
38-38.9	1.44	....	1.44	1.36	1.31
39-39.9	1.46	....	1.46	1.38	1.33
40 and above	1.48	....	1.48	1.40	1.35

TEXAS GULF COAST GRAVITY TABLE EXPLANATION

Column 1:
Humble Oil & Refining Co., 5-21-41, in-

cludes Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa (new), Raccoon Bend, South Thompson, Sugarland, Thompson, and Webster fields.

Stanolind Oil & Gas Co., 5-21-41, includes West Beaumont, High Island, and Spindletop.

Sinclair Prairie Oil Marketing Co., 5-21-41.

Stanolind Oil Purchasing Co., 4-9-42, includes Clinton and Lake Creek.

Pure Oil Co., 4-21-41, includes Louise and Ganado.

Gulf Refining Co., 5-21-41, includes Spindletop, Sour Lake, Lovells Lake, West Beaumont, Goose Creek, South Liberty, Big Creek, Blue Ridge, Fannett, Moore, Barbers Hill, Hankamer, Thompson, Lochridge, Dyersdale, and Hull (old).

Sun Oil Co., 5-21-41, includes Barbers Hill, Batson (old), Bayou Blue, Chacahoula, Cotton Lake, Esperson (below 35° gravity), Fausse Point, Goose Creek, Greens Lake, Hackberry (east and west), Hull (below 25°), Humble (below 35°), Nome, North Dayton (below 25°), Orange, Saratoga, Sour Lake, South Liberty, and Vinton.

Column 2:

Texas Co., 5-21-41, includes Arriola, Ganado, Hamman, Hillje, Humble, Kubela, Magnet, Manvel, Markham, Mauritz, Old Ocean, Pickett Ridge, Port Neches, Sour Lake, West Columbia, and Withers.

Column 3:

Pan American Production Co., 5-21-41, includes Hastings and South Houston.

Stanolind Oil & Gas Co., 4-1-41, includes High Island, Spindletop, Hastings, and South Houston.

Column 4:

Humble Oil & Refining Co., 5-21-41, includes Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull (new and old), Pierce Junction, Red Fish Reef, and Turtle Bay.

Gulf Refining Co., 5-21-41, includes Anahuac, Hull (new), Thompson (deep), Pierce Junction, and Orange.

Sun Oil Co., 5-21-41, includes Anahuac, Caplen and Turtle Bay.

Humble Oil & Refining Co., 3-29-41, includes Dickinson, Gillock, Hardin, League City, and Rowan.

Column 5:

Pan American Production Co., 5-21-41, includes Gillock, except scale starts at 95 cents below 21°.

Stanolind Oil Purchasing Co., 5-21-41, includes Fairbanks, North Houston, and Roslyn.

Continental Oil Co., 7-9-41.

Phillips Petroleum Co., 7-9-41.

Column 5 Winkler and Lea:

Stanolind Oil & Gas Co., 5-21-41, includes Winkler County only.

Gulf Refining Co., 5-21-41, includes Lea County, New Mexico, only.

Column 6 Gray County:

Texas Co., 5-21-41.

H. F. Wilcox Oil & Gas Co., 7-9-41.

Column 7 Lea County:

Magnolia Petroleum Co., 5-21-41.

Column 8 Eddy County:

Continental Oil Co., 5-30-41.

Column 9:

Shell Oil Co., Inc., 5-20-41, includes Crane, Ector, Howard, Glasscock, Upton, Winkler, and Yoakum counties, Texas, and Lea County, New Mexico.

Column 10 Texas Panhandle:

Humble Oil & Refining Co., 7-9-41.

Column 11 Panhandle:

Sinclair Prairie Oil Marketing Co., 5-23-11.

WEST TEXAS, PANHANDLE, AND NEW MEXICO GRAVITY TABLES

	1	2	3	4	5	6	7	8	9	10	11
Below 20	$0.70	....	....	....	....	....	....	....	$0.70	$0.73	....
20-20.9	.72	....	....	....	....	....	....	....	.72	.75	....
21-21.9	.74	....	....	....	....	....	....	....	.74	.77	....
22-22.9	.76	....	....	....	....	....	....	....	.76	.79	....
23-23.9	.78	....	$0.78	....	....	....	....	....	.78	.81	....
24-24.9	.80	....	.80	....	....	....	....	....	.80	.83	....
Below 25	....	$0.80	....	....	....	....	$0.80	....	....	....	$0.83
25-25.9	.82	.82	.82	....	$0.82	....	.82	....	.82	.85	.85
26-26.9	.84	.84	.84	....	.84	....	.84	....	.84	.87	.87
27-27.9	.86	.86	.86	....	.86	....	.86	....	.86	.89	.89
28-28.9	.88	.88	.88	$0.91	.88	....	.88	$0.88	.88	.91	.91
29-29.9	.90	.90	.90	.93	.90	....	90	.90	.90	.93	.93
30-30.9	.92	.92	.92	.92	.92	....	.92	.92	.92	.95	.95
31-31.9	.94	.94	.94	.97	.94	....	.94	.94	.94	.97	.97
32-32.9	.96	.96	.96	.99	.96	....	.96	.96	.96	.99	.99
33-33.9	.98	.98	.98	1.01	.98	....	.98	.98	.98	1.01	1.01
34-34.9	1.00	1.00	1.00	1.03	1.00	$1.03	1.00	1.00	1.00	1.03	1.03
35-35.9	1.02	1.02	1.02	1.05	1.02	1.05	1.02	1.02	1.02	1.05	1.05
36-36.9	1.04	1.04	1.04	1.07	1.04	1.07	1.04	1.04	1.04	1.07	1.07
37-37.9	1.06	1.06	....	1.09	1.06	1.09	....	1.06	....	1.09	1.09
38-38.9	1.08	1.08	....	1.11	1.08	1.11	....	1.08	....	1.11	1.11
39-39.9	1.10	1.10	....	1.13	1.10	1.13	....	1.10	....	1.13	1.13
40 and above	1.12	1.12	....	1.15	1.12	1.15	....	1.12	....	1.15	1.15

WEST TEXAS, PANHANDLE AND NEW MEXICO TABLE EXPLANATION

Column 1:

Humble Oil & Refining Co., 5-21-41, includes Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, and Yoakum counties, West Texas, and Lea County, New Mexico.

Gulf Refining Co., 5-21-41, includes Crane, Ector, Upton, Ward, and Winkler counties, West Texas.

Column 2:

Sinclair Prairie Oil Marketing Co., 5-21-41, includes West Texas and Lea County, New Mexico. Effective 5-29-41, in Eddy County, New Mexico.

Magnolia Petroleum Co., 5-21-41, includes Upton, Howard, Glasscock, Mitchell, Winkler, Cochran, Hockley, Yoakum and Gaines counties.

Column 3:

Texas Co., 5-21-41, includes Crane and Winkler counties, Texas, and Lea County, New Mexico.

Column 4 Texas Panhandle:

Magnolia Petroleum Co., 7-9-41.

EASTERN STATES

Pennsylvania and Ohio

South Penn Oil Co.:
- National lines, 3-26-42 ..... $3.00
- Southwest Penn, 3-26-42 ..... 2.65
- Eureka lines, 3-26-42 ..... 2.59
- Corning grade, 5-27-41 ..... 1.31

Tide Water Associated Oil Co.:
- Bradford, 3-26-42 ..... $3.00
- Allegany, N. Y., 3-26-42 ..... 3.00

Pennzoil Co.:
- Group A, 3-26-42 ..... $2.93
- Group B, 3-26-42 ..... 2.92
- Group C, 3-26-42 ..... 2.91
- Group D, 3-26-42 ..... 2.90
- Group E, 3-26-42 ..... 2.88

Quaker State Oil Refining Corp.:
- In Buckeye lines, 3-26-42 ..... $2.55
- In Eureka lines, 3-26-42 ..... 2.59

Kentucky

Ashland Oil & Transportation Co., 6-19-41:
- Big Sandy River $1.36
- Kentucky River 1.43

Sohio Corp., 5-21-41:
- Birk City $1.32

West Virginia

Pure Oil Co.:
- Cabin and Kelly Creek, 3-27-42 ..... $2.59

MIDDLE WEST FLAT PRICES

Illinois and Indiana

Ohio Oil Co.:
- Illinois basin, 5-21-41 ..... $1.37
- Eastern Illinois, 5-21-41 ..... $1.22
- Western Indiana, 5-21-41 ..... 1.22

Magnolia Petroleum Co.:
- Illinois basin, 5-21-41 ..... $1.37

Carter Oil Co.:
- Illinois (Louden), 5-21-41 ..... $1.37

Sohio Corp.:
- Illinois basin, 5-21-41 ..... $1.37

Texas Co.:
- Illinois basin, 5-21-41 ..... $1.37

(Continued on Page 103)

CRUDE-OIL PRICES EFECTIVE MAY 25, 1941

(All gravities above those quoted take highest price offered in that field)

Gravity	Signal Hill (Long Beach)	Wilmington	Seal Beach	Huntington Beach	Inglewood	Olinda-Brea Canyon	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyete Hills	Santa Fe Springs	Greeley, Canal, Wasco	Coles Levee	Mountain View	Elk Hills, Buena Vista Hills Midway-Sunset, Lakeview area	Coalinga	Kettleman Hills	Elwood Terrace
14-14.9	....	$0.68	....	$0.71	....	$0.70	$0.70	$0.70	$0.70	$0.72	....	....	....	....	....	$0.73	$0.73	....	....
15-15.9	....	.71	....	.75	$0.76	.72	.72	.71	.72	.72	....	....	....	....	....	.73	.73	....	....
16-16.9	....	.74	....	.79	.79	.75	.74	.73	.75	.72	....	....	....	....	....	.73	.73	....	....
17-17.9	....	.78	....	.82	.82	.78	.77	.76	.78	.72	....	....	....	....	....	.75	.73	....	....
18-18.9	$0.80	.82	....	.86	.85	.81	.80	.79	.82	.74	....	....	....	....	....	.78	.73	....	....
19-19.9	.84	.86	....	.89	.88	.85	.83	.82	.85	.77	....	....	....	....	$0.73	.81	.75	....	....
20-20.9	.88	.90	....	.93	.92	.88	.86	.85	.89	.80	....	....	....	....	.76	.85	.77	....	....
21-21.9	.92	.94	....	.96	.95	.91	.89	.89	.92	.84	....	....	....	....	.79	.90	.80	....	....
22-22.9	.96	.98	$0.88	.99	.98	.95	.93	.93	.96	.87	....	....	....	....	.83	.94	.83	....	....
23-23.9	1.00	1.02	.92	1.02	1.01	.98	.97	.96	1.00	.91	....	....	....	....	.87	.99	.86	....	....
24-24.9	1.03	1.06	.97	1.05	1.04	1.01	1.01	1.02	1.03	.94	$0.99	....	....	....	.90	1.03	.89	....	....
25-25.9	1.07	1.09	1.01	1.08	1.07	1.04	1.05	1.06	1.07	.98	1.02	....	....	....	.94	1.07	.92	....	....
26-26.9	1.11	1.12	1.06	1.11	1.10	1.08	1.09	1.10	1.11	1.01	1.06	....	....	....	.97	1.11	.95	....	....
27-27.9	1.15	1.15	1.10	1.14	1.14	1.11	1.13	....	1.15	1.05	1.10	$1.04	....	....	1.01	1.15	.98	....	....
28-28.9	1.18	1.18	1.15	1.17	1.17	1.14	1.17	....	....	1.08	1.13	1.08	....	....	1.04	1.19	1.00	....	....
29-29.9	1.20	1.21	1.19	1.20	1.20	....	....	....	....	1.12	1.17	1.12	....	....	1.07	1.24	1.02	....	....
30-30.9	1.23	1.24	....	1.23	1.22	....	....	....	....	1.15	1.21	1.15	$1.01	$1.09	1.10	1.28	1.04	....	f.o.b.
31-31.9	....	....	....	....	1.24	....	....	....	....	1.19	1.24	1.19	1.04	1.13	1.14	....	1.06	....	ship
32-32.9	....	....	....	....	....	....	....	....	....	1.23	1.28	1.23	1.07	1.14	1.17	....	1.09	....	....
33-33.9	....	....	....	....	....	....	....	....	....	1.27	....	1.26	1.10	1.17	....	....	1.11	....	$1.22
34-34.9	....	....	....	....	....	....	....	....	....	1.31	....	1.30	1.13	1.20	....	....	1.13	....	1.25
35-35.9	....	....	....	....	....	....	....	....	....	1.35	....	....	1.16	1.22	....	....	....	$1.23	1.26
36-36.9	....	....	....	....	....	....	....	....	....	1.39	....	....	1.19	1.25	....	....	....	1.26	....
37-37.9	....	....	....	....	....	....	....	....	....	1.43	....	....	1.22	....	....	....	....	1.29	....
38-38.9	....	....	....	....	....	....	....	....	....	1.47	....	....	1.25	....	....	....	....	....	....
39-39.9	....	....	....	....	....	....	....	....	....	1.51	....	....	....	....	....	....	....	....	....
40-40.9	....	....	....	....	....	....	....	....	....	1.53	....	....	....	....	....	....	....	....	....

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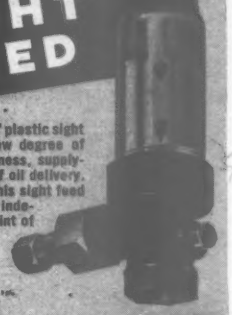

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Among the

Drilling Contractors

Cron & Gracey Drilling Corp., Houston, Tex., has the contract for a workover job on Fohs Oil Co. 1 Lake Long, in the Lake Long field, near Houma, La Fourche Parish, Louisiana. This contractor is also working over the discovery well of the Bayou Couba field, 1 Delta Securities Co., in St. Charles Parish, for Gulf Refining Co.

Allen & Morris, San Antonio, Tex., will drill a 7,000-ft. test for Darby Petroleum Co. It is the 1 A. J. Bankhead, about 5 miles southeast of Inez and 8 miles northeast of the Keeran field, in Victoria County, Texas.

Wright Drilling Co., Houston, Tex., is the contractor for a 6,500-ft. wildcat, 1 A. A. Egg, to be drilled for John B. Coffee north of the Maurbro field, in Jackson County, Texas. Wright has just finished a producer in the West Mauritz field of Jackson County, 1 Westhoff-McCrory, for the same operator, and has skidded the rig for 1-A Westhoff-McCrory, in the same field for Mr. Coffee. For W. Stewart Boyle this contractor will drill a wildcat, X-1 T. N. Mauritz, in the A. Kountze Survey, Jackson County, 9 miles southeast of Ganado. It is to go to 6,000 ft. H. Merlyn Christie has awarded a contract to Wright for 1 Graves, in the Patrick Scott Survey, North La Ward field, Jackson County.

Grey Wolfe Drilling Co., Houston, Tex., has received the contract to drill Pinehurst Unit 2 in the new Pinehurst field of Montgomery County, Texas, for La Gloria Corp. It also will drill No. 22 in the north block of the La Gloria field, Montgomery County, for La Gloria Operators Committee. This contractor has completed a dry hole for S. A. Guiberson and J. F. Lucey, a Smackover lime test near Ferris, in Dallas County, Texas. This project was a Texas Co. farmout and the hole was carried to 4,823 ft. in metamorphic shale.

Gilger Drilling Co., Houston, Tex., is at 4,100 ft. on Phillips Petroleum Co. 1 Stot, northwest of the Jefferson field, in Cass County, Texas. Gilger recently completed Grubb & Hawkins 4 Cass County School Lands, in the Kildare area of Cass County.

Falcon-Seaboard Drilling Co., Houston, Tex., is moving in material for 13 Realty Operators, in the Gibson field, Terrebonne Parish, Louisiana, for Shell Oil Co., Inc. It recently completed 12 Realty Operators for Shell. Falcon-Seaboard was setting surface pipe at 750 ft. last week at Vincent & Welsh 1 D. J. Miller, in the East Tepetate field, Acadia Parish. It was still drilling Sun Oil Co. 1 Daily, in the Egan area of Acadia Parish.

Harrison & Dillard, Houston, Tex., have drilled 1 Frank Stephens, a Cities Service Oil Co. wildcat a mile east of Ramsey, in Colorado County, Texas, to 10,505 ft., where it tested 194 bbl. of distillate and 8,230,000 cu. ft. of gas, and is still testing. This contractor recently finished Continental Oil Co. 2 Jaenecke, in South Roanoke Parish, Louisiana, a dry hole at 9,252 ft.

O. W. Dyer, Jr., Houston, Tex., has contracts for two wells to be drilled for Atlantic Refining Co., both in the Neale area of Beauregard Parish, Louisiana. One is 4 Speers and the other is E-3 Rice.

Cross Drilling Co., Odessa, Tex., will drill Belfort Oil Co. 1 University, Section 14, Block 16, University Land, in Ward County, West Texas, to 3,500 ft.

B. A. Duffy, Abilene, Tex., is drilling an Ordovician test in Menard County, Texas, for A. G. Talbot. It is in Section 55, J. H. Gibson Survey, in the northwest part of the county. Duffy is cleaning out his 1 Bob Wilson in southwest Concho County, Texas, after a favorable oil show following shot from 3,718-3,863 ft.

J. S. Pittman, McCamey, Tex., has finished a good well for Cardinal Oil Co. in the White & Baker pool of Pecos County, West Texas. The well, 4-L White & Baker, pumped 91 bbl. per day from 1,933 ft., total depth.

George P. Livermore, Inc., Lubbock, Tex., has contract for an Ordovician test ¾ mile southwest of the Heiner pool in Pecos County, Texas. It is Culbertson & Irwin 1 R. G. Heiner, Section 589, G.C.&S.F. Survey.

Patrick & Tyrell, Houston, Tex., have moved in heavy rotary rig for a 9,700-ft. Smackover lime test in northern Smith County, East Texas.

It is known as C. L. Wyckliffe et al 1 O. Hackett, 1½ miles north of Sand Flat, in the Samuel Leeper Survey.

Delta Drilling Co., Tyler, Tex., will drill a deep Paluxy test in Smith County, East Texas, for C. M. Beckett and P. H. Torrans, 3 miles northwest of Grand Saline. It will go to 6,500 ft.

Falcon-Seaboard Drilling Co., Tulsa, and **Harbor Drilling Co.**, Wichita, Kans., are starting a new well in Stafford County, Kansas, C N½ NE SE 21-22s-12w, on the Spangenberg lease.

Helmerich & Payne, Inc., Tulsa, has contract for Texas Co. 3 Burmeister, C SW SE 2-17s-11w, in the Kraft-Prusa-Krier field, Barton County, Kansas.

Mercury Drilling Co., Tulsa, has contracted to drill N. Appleman & Co. and Bradley Brothers, Wichita, Kans., 1 Decker, 2-17s-9w, Ellsworth County, Kansas, 1 mile west of the Lorraine (Lansing-Kansas City, Arbuckle) field.

Loffland Brothers, Tulsa, have contract for Tide Water Associated Oil Co. et al 1 Harry Forman, C SE SW 15-5n-8w, on the edge of the Chickasha field, Grady County, Oklahoma.

Big Chief Drilling Co., Oklahoma City, Okla., is contractor on the Basil Wagner and Charles M. Day 1 Calvin, SW SW NE 3-15n-5e, 2 miles northeast of Kendrick in Lincoln County, Oklahoma. Location is immediately north of Magnolia Petroleum Co. 1 Clark, a gas well in the Skinner sand.

Penrod Drilling Co., Shreveport, La., has contracted to drill H. L. Hunt 95-F Goodpine, 37-7n-3e, and 47-A Goodpine, 15-7n-3e, in the Nebo field, La Salle Parish, Louisiana.

Frank Woods, drilling contractor of Wichita Falls, Tex., has been awarded drilling contract on Devore & Slade 1 Dinwiddle, on the Humble block near the Castro and Swisher County lines in Texas. Rig was being moved and it was expected that the hole would be spudded the middle of last week. Contract depth is 5,500 ft. Location is Section 10, Block 9-T, T.& N.O. Survey, Castro County, Texas.

Hayes B. Ownby Drilling Co. has staked a wildcat in Red River Parish, Louisiana, the 1 A. N. Sample, SE 3-14n-11w, projected to 6,500 ft.

Rogers Brothers Drilling Co. has made location for 1 J. W. McCrary, 1,650 ft. from the south and 990 ft. from the east lines of east 80 acres of S½ Section 64, Block 14, H.&T.C. R.R. Survey, in the shallow field 5 miles southwest of Electra, in Wilbarger County, Texas. It will be a 2,000-ft. rotary test.

J. W. Lang, Inc., has the contract to drill Stanley L. Findley 1 Peter McNab, NW NE SE 9-3n-13w, Allegan County, Michigan.

Muskegon Development Co. has been awarded the contract to drill Gulf Refining Co. 1 Bedell, C S½ NE NE 33-15n-4e, Bay County, Michigan.

Robert W. Atha will drill Gulf Refining Co. 2 Paige, C N½ NW NW 34-15n-4e, Bay County, Michigan.

Ralph Perry, drilling contractor, has been awarded contract to drill N. R. Dodd 2 A. Pifer, SW NW NW 10-2s-16w, Van Buren County, Michigan.

Mid-West Drilling Co., Salem, Ill., is rigging up rotary in the East Centralia (Illinois) field to drill Louis Lilly 2 Burge, SE SW NE NW 16-1n-1e, east of 1 Burge which is now producing 50 bbl. daily from the Cypress sand.

Lupher Drilling Co. has negotiated a contract to resume drilling and complete a wildcat started in November 1941 by Powers & Worsley in S½ SE SE 31-19n-10w, Osceola County, Michigan. The wildcat, 1 Briggs, is 3 miles north of the Reed City field, and was drilling at 3,350 ft.

Clapsaddle Drilling Co. is the firm name of a new company which has been organized by Clifford F. Clapsaddle, former partner with Lester Harris, in Southwest Michigan oil development. The home office of the firm is Riverside, Mich. A wildcat has recently been started in Van Buren County.

Allied Well Service, Inc., Houston, Tex., has the contract for recompletion of Three Bee Investment Corp. 2 Gray, in the Dickinson field of Galveston County, Texas. It is rigging up for a workover job on a well for Union Sulphur Co. in the Hackberry field of Cameron Parish, Louisiana.

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Rocky Mountain Area

(Continued from Page 79)

nelusa is now drilling its second well to the west of the discovery, and MacKinnie Oil & Drilling Co., which last year completed a gas well in the Dakota 1 mile to the south of the discovery, is expected to drill to the Tensleep at a location not yet determined. Northern Ordnance, Inc., is drilling at 3,450 ft. on the Clark's Fork structure, Montana side, 6 miles north and west of the new Stanolind operation.

Magnolia Petroleum Co. is preparing to drill this year in the Piceance Creek gas field in Rio Blanco County, Colorado, following the cancellation of a contract it made 2 years ago for the sale of gas to independent interests who proposed to pipe it to cities and towns in that area. The company drilled three wells in 1929, 1931 and 1932, the best of which gaged 9,200,000 cu. ft. The original block, consisting of government land, comprised 61,400 acres within the unitized area. No drilling has taken place in the past 10 years.

COLORADO COMPLETIONS

Rangely, Rio Blanco County: United Oil Production Co. 6-A Hunter-Green, CWL NW SW 5-1n-102w, T.D. 1,350 ft., completed as a water well.

WYOMING COMPLETIONS

Garland, Big Horn County: Ohio Oil Co. 2 Utah-Wiley, C NW SW Lot 59-56n-97w, T.D. 4,055 ft., P.B. to 3,995 ft., 100 bbl., Madison.

MONTANA COMPLETIONS

Cut Bank, Glacier County: William Hanlon-A. B. Cobb & Co. 1 Tribal-227, SE SE NE 13-32n-6w, T.D. 2,775 ft., 7-in. 2,705 ft., no Sunburst sand, Cut Bank 2,680-2,740 ft., main pay 2,735-40 ft., swabbed 35 bbl., will shoot.

Kevin-Sunburst, Toole County: Cobb-Gardrock Oil Co. 1 Government, SW SE NE 17-35n-3w, T.D. 2,111 ft., small show oil in contact 2,004-08 ft., water 2,015-42 ft., dry.

Eastern Kentucky

(Continued from Page 83)

number of wells nearing the completion stage.

EASTERN KENTUCKY COMPLETIONS

Floyd County: Kentucky-West Virginia Gas Co. 701 Allen Cline land on Johns Creek, flowed 119,000 cu. ft. gas after shot, T.D. 2,580 ft. in shale.

Johnson County: Kentucky-West Virginia Gas Co. 709 C. M. Patrick tract on Jenny Creek, flowed 127,000 cu. ft. gas after shot, T.D. 2,449 ft. in Big Six.

INDIANA COMPLETIONS

Gibson County: R. D. Brown, Inc. 2 Clem Lehman, NW NE NW 36-1s-10w, pumped 26 bbl. oil and 22 bbl. water, acidized, McClosky 1,787-92 ft., T.D. 1,792 ft.

R. D. Brown, Inc. 1 fee, SE NW NW 36-1s-10w, pumped 93 bbl., shot 1,375-87 ft., Hardinsburg sand 1,372 ft., saturation 1,375-1,417 ft., T.D. 1,418 ft.

Knox County: Hull & Beek 1 J. W. Frey, SW SW NE 14-2n-11w, dry at 1,935 ft., Glen Dean 1,421 ft., Golconda 1,518 ft., Barlow 1,590 ft., Cypress sand 1,632 ft., Paint Creek 1,716 ft., Benoist sand 1,750 ft., Renault 1,772 ft., Ste. Genevieve 1,808 ft., McClosky 1,890 ft.

Posey County: Wabash O. & G. 2 E. B. Mumford, NE NE NW 31-3s-13w, dry at 2,991 ft.

R. L. Craig 1 Louisa Mertens, SW SW SW 16-7s-12w, dry at 2,355 ft., junked hole.

Superior 32 New Harmony Realty, SW NE NW 3-5s-14w, pumped 59 bbl., fluid, 98 per cent water, shot 2,602-06 ft., Benoist 2,733-63 ft., T.D. 2,851 ft., P.B. 2,774 ft.

K. R. Bixby 6 J. Keenck, SE NE NW 23-5s-12w, dry at 750 ft.

Superior 1 Susanne Guenther, NW SE NW 29-4s-13w, dry at 2,252 ft., Kincaid 1,683 ft., Degonia 1,861 ft., Clore 1,898 ft., Palestine 1,949 ft., Menard 2,008 ft., Waltersburg sand 2,093 ft., Tar Springs sand 2,226 ft.

Spencer County: L. L. Benoist 4-B L. M. Abbott, NW NE NW 7-7s-7w, dry at 1,381 ft., Waltersburg sand 1,040 ft.

Warrick County: W. P. Dearing 1 W. H. Gentry, SW SW NW 11-4s-8w, dry at 2,500 ft., Osage 2,320 ft.

Permian Basin, Panhandle

(Continued from Page 71)

wells are to be drilled as outlets are already loaded to capacity. The order, effective immediately, prohibits the use of any materials to drill, complete, or provide additions to any well in any discovered or undiscovered natural-gas field in Carson, Collingsworth, Gray, Hansford, Hartley, Hutchinson, Moore, Potter, Sherman, and Wheeler counties.

PANHANDLE COMPLETIONS

Gray County: Phillips 1 Franwill (Clay), NW SE Sec. 185, Blk. B-2, H.&G.N. Sur., elev. 3,270 ft., dry, T.D. 2,967 ft.

Hutchinson County: Dolomite Prod. Co. 8 J. J. Perkins, 933 ft. from W, 1,536 ft. from S of lease, J. M. Daniel Sur., pumped 100 bbl., pay 3,000 ft., T.D. 3,101 ft.

Skelly 2 H. W. Carver, 330 ft. from N and E lines, W. M. Neil Sur., Varver subd., elev. 3,341 ft., show oil 3,220 ft., dry, T.D. 3,300 ft.

Skelly 4 Ira Merchant, Sec. 34, Blk. 74, H.&T.C. Sur., dry, T.D. 2,965 ft.

SOUTHEAST NEW MEXICO COMPLETIONS

Jackson-Grayburg, Eddy County: Western Prod. 6-B Burch, SW SE 23-17s-29e, elev. 3,578 ft., flowed 100 bbl., pay 2,730 ft. lime, T.D. 2,869 ft.

South Eunice, Lea County: Texas Pacific 25-A State, NE NE 8-22s-36e, elev. 3,579 ft., flowed 264 bbl., pay 3,820 ft., lime, T.D. 3,850 ft.

La.-Ark. Fields

(Continued from Page 84)

6w, pumped 59 bbl. in 12 hr., 34.9 gravity, perf. 5,770-84 ft., T.D. 6,201 ft.

ARKANSAS COMPLETIONS

Wildcats

Nevada County: Hunt Oil and Arkansas Fuel 1 Stamps, NW NW 35-14s-23w, dry, T.D. 6,191 ft., Cotton Valley 4,707 ft., Buckner 5,855 ft., Smackover 5,975 ft.

Ouachita County: Jack Carnes 1 H. L. Berg, SW NE 6-14s-17w, dry, T.D. 4,215 ft., Midway 900 ft., Travis Peak 2,335 ft., Cotton Valley 3,020 ft., Buckner 3,889 ft., Smackover 4,083 ft.

Fields

Midway, Lafayette County: Southwood 8 W. E. Hodnett, NE SE 18-15s-23w, dry, T.D. 6,622 ft., Smackover porosity 6,597 ft.

New London, Union County: Marine Oil 1 Agerton, NW SW 12-18s-12w, flowed 119 in 18 hr. through choke, perf. 5,732-46 ft., T.D. 5,871 ft.

Rainbow, Union County: Curtis Kinard 1 J. M. McCain, SW SE 4-17s-14w, dry, T.D. 2,908 ft., Wilcox 1,043 ft., Midway 1,458 ft., Annona 2,456 ft., Blossom 2,759 ft.

Stephens, Columbia County: R. H. Crow 1-B G. M. Westley, SW SW NE 10-15s-20w, dry, T.D. 2,606 ft., chalk 1,726 ft.

R. H. Crow 1 F. Hall, SE NW 11-15s-20w, pumped 190 bbl., perf. 2,487-92 ft., T.D. 4,003 ft.

MISSISSIPPI

JACKSON, Miss.—Pure Oil Co. 1 J. M. McDowell, wildcat discovery well, 6 miles southwest of Natchez, in Adams County, Mississippi, was undergoing further testing as last week closed. In the latest reported test, the well flowed 300 bbl. of oil and 50 bbl. of salt water in 72 hours through 10/64-in. choke, with perforations at 10,281-85 ft. Tubing pressure was 1,800 lb. The fluid then turned to about 85 per cent salt water, according to reports. Perforations were squeezed with a view to testing at another level.

This test found the base of the Jackson and the top of the Mood's Branch at 2,173 ft., Cockfield 2,222 ft., Cook Mountain shale 2,681 ft., Cook Mountain lime 2,832 ft., Sparta 2,950 ft., Cane River 3,725 ft., Tallahatta 4,061 ft., Wilcox 4,298 ft., Midway 7,365 ft., Selma 8,428 ft., Eutaw 9,178 ft., Tuscaloosa 9,708 ft., Marine Tuscaloosa 9,906 ft., Massive sand 10,268 ft., base Massive sand 10,400 ft.

The California Co. 1 G. T. Smith, 4-7n-7e, Lincoln County, which flowed 11 bbl. of oil through open tubing, was drilling at 11,338 ft. in hard sand and shale.

California

(Continued from Page 75)

and for this reason the outcome of work will be watched with interest. At La Mirada, Texas Co. is attempting to find Miocene production in an area that has always been considered as having special merit, although several holes already have been drilled and abandoned. This area is west of the West Coyote field. Texas Co. is one of the most aggressive prospectors in the state and this should pay off in the not far distant future. The company's best bet at present is its Gill wildcat in the Mendota section of Madera County in the San Joaquin Valley. This test appears almost definitely assured of commercial gas production. Several thin oil sands failed to show. The important part of this is that the gas zone found above the oil sand may contain a little distillate. This places it in the category of an oil field rather than a dry-gas field.

LOS ANGELES BASIN COMPLETIONS

Torrance, Los Angeles County: Dunlap Trust No. 2, 7-W Harbor, 30-4s-13w, pumped 80 bbl., 14.1-gravity, 6 per cent cut, T.D. 3,658 ft., gravel packed perf. 3,180-3,270 ft., 3,541-3,658 ft., completed in Ralnger zone of Pliocene age.

Yorba Linda, Orange County: Shell Oil Co. 68-16 Olinda fee No. 4, 16-3s-9w, pumped 230 bbl., 16.1-gravity, 4.3 per cent cut, T.D. 2,320 ft., perf. 2,227-2,315 ft., completed in Olinda zone of Miocene age.

PERSONALS

THOMAS L. TAGGART

Competent Service Record Rewarded By Promotion

THOMAS L. TAGGART, for some time assistant to the manager of the natural-gas department of Standard Oil Co. of California, has been appointed manager succeeding Earle Derby, who has retired after long service with the company. Tom Taggart, former president of the California Natural Gasoline Association, is one of the most popular men in Standard's organization.

After his graduation from the University of California at Berkeley, Mr. Taggart was employed by Pacific Gasoline Co. and spent several years as a plant operator, gas tester, laboratory assistant and gas scout. In 1925 he was transferred to Los Angeles as field scout and contract agent, continuing in this capacity for the newly formed Standard Gasoline Co. when Standard of California purchased Pacific Gasoline Co. in 1926. For some years he was Los Angeles representative of Standard Gasoline Co. with the title of superintendent.

In June 1942 he was moved to the San Francisco office as assistant to Mr. Derby in order that he might become familiar with all details of that office.

Mr. Taggart has an impressive list of degrees, an A.B. from the University of Belfast, Ireland; a Ph.D. from the University of Leipsig, Germany, and a B.S. from the University of California. During World War I he was a captain in the Royal Irish Rifles, and is a native of Ireland.

P. M. McConihe, manager of lubricating oils for Seaside Oil Co. at Santa Barbara, Calif., and petroleum engineer and member of A.C.S. and S.A.E., has accepted a captaincy in the U. S. Marines and will report for active duty immediately.

W. C. Whaley, vice president and general manager of Barnsdall's California activities reported to the directors of the California Petroleum Safety Board that a major reduction in disabling accidents to employes of independent operators had been effected during 1942. The board consists, in addition to Mr. Whaley, of **L. L. Aubert** of Bankline Oil Co. and **L. A. Cranson** of Honolulu Oil Corp.

T. E. Wilde and **C. F. Adam,** of Union Oil Co.'s Oleum, Calif., refinery technical staff, have been transferred to the manufacturing department at the home office of the company in Los Angeles.

John T. Doyle, who has been engineer in Shell Oil Co., Inc.'s Los Angeles office for some time, has been advanced to acting division engineer of the coastal division.

Walter L. McCloy, vice president of the Ohio Fuel Gas Co., Columbus, Ohio, retired from active duty March 1 after 55 years of continuous service in the natural-gas and oil industry. He was associated with the Philadelphia Co. and affiliated companies at Pittsburgh, Pa., from 1888 until 1920 when he became vice president of the Guffey-Gillespie Oil Co. with headquarters at Tulsa. He was later associated with **J. S. Cullinan** in activities in the Monroe gas field in Louisiana. For the past 19 years he has been connected with the Ohio Fuel, a subsidiary of Columbia Gas & Electric Corp. While retiring from active duty, he will be retained in a consulting capacity and continue as a member of the board of directors. **Thomas H. Kerr,** vice president in charge of transmission and distribution, will retire as of the same date. He also will continue as a member of the board.

Walter C. Mendenhall, director of the U. S. Geological Survey, retired February 27, when he completed 48 years, 5 months, and 6 days as a scientist in the survey. **Dr. Julian D. Sears,** now administrative geologist, will replace him temporarily as acting director.

Robert T. Collier has resigned as director of marketing of the PAW to return to his private business as vice president of the Great Lakes Carbon Corp. No successor has yet been announced. Mr. Collier came with PAW last July with the understanding that he would return to his company after 6 months.

Lt. James A. Webb, petroleum geologist of Houston, Tex., now with the Yanks in Africa, writes that he got a "real thrill" when he found a home newspaper wrapped around a Christmas package. "Even the real estate ads will be read." His roommate is **Lt. Robert L. Daniel,** formerly senior engineer in the civil engineering department of Humble Oil & Refining Co., Houston. They were expecting to be joined by **Capt. Temple Hargrove,** independent oil producer of Houston, who entered military service in the transportation division last October.

William Clint Little, Houston, Tex., attorney and oil man before he entered war service, has been advanced to first lieutenant at Randolph Field, Texas, where he is assistant chief of the administrative operations division of the Gulf Coast training center.

J. S. Abercrombie, independent oil operator, and **James A. Elkins,** director of Pure Oil Co. and member of the law firm which serves as general counsel for Pure, have been elected to the board of the Houston, Tex., branch of the Federal Reserve Bank.

Sam M. Greenidge, Fort Worth, Tex., Texas Pacific Coal & Oil Co., has been elected president of the Fort Worth Petroleum Engineers' Club. **A. E. Willig,** Texas Co., is executive vice president; **Early Spiars,** Parkersburg Rig & Reel Co., first vice president; **V. P. Shelton,** Stanolind Oil & Gas Co., second vice president, and **Rex Rader,** Stanolind, secretary-treasurer.

Max A. Sherwood, manager of the eastern production division for Shell

Oil Co., Inc., last week was honored by more than 100 employes of the district at a banquet in Centralia, Ill. Mr. Sherwood was transferred to Shell's Tulsa office March 1. **C. R. Bickel,** formerly Kansas division manager for Shell at Wichita, succeeds Mr. Sherwood who joined the company in 1926 in the Texas Panhandle. **A. N. Lucie-Smith,** Shell production man at Maracaibo, Venezuela, was among the guests at the Centralia affair.

George N. Jenks, formerly chemical engineer for Gulf Oil Corp., Houston, Tex., has completed the course at the Naval Reserve midshipmen's school at Columbia University, New York, and has been commissioned an ensign and assigned to duty at Seattle, Wash.

Kenneth Gow, geologist with the Superior Oil Co., recently stationed at Evansville, Ind., has been transferred to the Rocky Mountain area with headquarters in Denver. He succeeds **H. S. McCabe,** who resigned to go with the Stanolind Oil & Gas Co., with headquarters at Casper, Wyo.

W. H. Curry, geologist for the Atlantic Refining Co., has been in the Rocky Mountain area for the past month looking over the territory in the interest of that company.

Claud B. Hamill, of Hamill & Smith, oil-producing firm of Houston, Tex., and chairman of the Harris County War Savings Committee, was a speaker last week at the launching of the Liberty ship John Bell. "German and Japanese propagandists are working hard to divide us by indicating that one or the other is fighting the other's battles," said Mr. Hamill. "We must be too clever for this. The unity of the United Nations must be maintained."

George D. Wilson, public relations director of Houston Oil Co., Houston, Tex., was toastmaster at the annual brotherhood dinner last week sponsored by the Houston Roundtable, National Conference of Christians and Jews. He was cochairman of the city's Roundtable work for Brotherhood Week and served in the absence of **George W. Strake,** oil operator and chairman. He was introduced by **T. J. Donoghue,** general Roundtable chairman and formerly vice president of Texas Co.

Dr. Frank H. Dotterweich, special consultant in the natural-gas and natural-gasoline division of the PAW and head of the gas engineering department of Texas College of Arts and Industries, Kingsville, Tex., has introduced a highly specialized war course at the college, which carries engineering students through the process of manufacturing aviation fuels to their use in modern aircraft engines. Included in the classroom equipment is a knock tester lent by Ethyl Corp.

J. W. Caplan, Amarillo, Tex., a brother-in-law of the late Cy Reiger and of **Mandy Reiger,** Panhandle independent operators, has been made manager of the Reiger oil properties. Mandy is now in military service and Mr. Caplan will direct affairs of the family interests for the duration.

T. D. Dorrough, of the Gulf Oil Corp., has opened headquarters at Billings, Mont., where he will be in charge of land matters for his company for the Rocky Mountain district.

Carl Porter, draftsman in the geological department of Humble Oil & Refining Co. in Corpus Christi, Tex., until he donned a uniform last July, has been promoted to the grade of staff sergeant at the Roswell Army Flying School, Roswell, N. M.

Capt. Hillord Hinson, recently promoted from lieutenant at Fort Sill, Oklahoma, where he is serving in the artillery reception center, was geologist for Harrison Oil Co., Houston, Tex., for about 5 years until he entered active military service. He is a graduate of the University of Oklahoma.

R. Van A. Mills spent last week in Houston, Tex., in connection with his work as proration engineer for Continental Oil Co., Ponca City, Okla. The now-familiar term "gas-oil ratio" was introduced to the oil industry by Mr. Mills when he was petroleum engineer at the U. S. Bureau of Mines Petroleum Experiment Station in Bartlesville, Okla.

John A. Sweeney, who was payroll clerk for Humble Oil & Refining Co. at its Galveston Bay, Tex., plant, is now stationed at Camp Haan, California, having received his commission as a lieutenant at Camp Davis, North Carolina.

W. E. Larguier, Baton Rouge, La., has been promoted to assistant superintendent of the cracking department, Standard Oil Co. of Louisiana, working under **J. M. Jennings,** head of this particular department at the Baton Rouge refinery.

D. E. Stuckey, district geologist for Cities Service Oil Co., at Wichita, Kans., has been promoted to assistant division geologist and transferred to the company's operating headquarters at Bartlesville, Okla. **Paul A. Harper,** previously assistant to Mr. Stuckey at Wichita, has been promoted to district geologist there.

A. N. Griffith, Midland, Tex., has been made West Texas production superintendent for Lario Oil & Gas Co., a position he will assume March 5. Mr. Griffith resigned last week as division superintendent for Baroid Well Logging Service, a position he held for the past 3½ years, to join Lario. Previously, he was division production engineer at Midland for Shell Oil Co., Inc.

James W. (Tag) Taggart, for the past 5½ years associated with Oil Well Supply Co. as field representative in Illinois, working the Johnsonville field out of the Fairfield store, has been called to active Navy duty and is now stationed at Treasure Island, San Francisco. He was a member of the Naval Reserves since last April.

C. E. Powell has been appointed superintendent of Cities Service Oil Co.'s natural-gasoline plant at Pampa, Tex., succeeding **J. L. Sperry** who has been transferred to New York.

Webb W. Johnson, engineer at Ponca City, Okla., for Empire Pipeline Co., has resigned to accept a position with War Emergency Pipelines, Inc., in Illinois.

Grosvenor Jones, assistant director of the Bureau of Foreign and Domestic Commerce, has retired, for reasons of health, after 33 years of service with the federal Government, chiefly with the Department of Commerce.

Henry J. Muller has been appointed general sales manager of the White Star-Ohio division, Socony-Vacuum Oil Co., Inc., with headquarters in Detroit. Mr. Muller succeeds the late Charles S. Smith. **Thomas E. Richards,** who has been operations representative in the lubricating department for the central marketing division, succeeds to the position Mr. Muller held as assistant to **C. E. Arnott,** vice president.

J. L. Stewart has resigned the position of deputy oil controller for Canada, which he has held since November 1940.

Shifts: **R. E. Harrell,** engineer, War Emergency Pipelines, Inc., Little Rock, Ark., to Cincinnati, Ohio; **L. D. Cason,** engineer, Texas Co., Baton Rouge to New Iberia, La.; **K. A. Anderson,** engineer, Phillips Petroleum Co., Phillips, Tex., to St. Edward, Neb.; **John O'Keaffe,** engineer, Richfield Oil Corp., Taft to Long Beach, Calif.; **Charles Morgan,** superintendent, Continental Oil Co., Artesia, N. M., to Denver, Colo.; **Henry A. Jackson,** engineer, Magnolia Petroleum Co., Lovington to Artesia, N. M.; **Charley F. Elder,** engineer, Texas Co., Salem to McLeansboro, Ill.; **Guy S.**

Conners, Williams Brothers Corp., Little Rock, Ark., to Cincinnati, Ohio; **J. D. Freeman,** War Emergency Pipelines, Inc., Little Rock, Ark., to Cape Girardeau, Mo.; **I. L. Ault,** superintendent, Magnolia Petroleum Co., Alice, Tex., to West Lake, La.

James O. Lindsey, formerly assistant purchasing agent for Shell Oil Co., Inc., at Tulsa, and now stationed at Santa Ana air base in California, has been promoted to a captain.

Frank Harrison, formerly with Pure Oil Co., in the Seminole district of Oklahoma, is now safety director for the company, with offices in Chicago, Ill.

W. O. Schock, oil operator of St. Louis, Mo., and formerly of Tulsa and Okmulgee, Okla., is now a major in the Army and is stationed at Seattle, Wash.

William Naden, superintendent of the Colonial Beacon Oil Co. refinery at Everett, Mass., has been appointed general superintendent of Standard Oil Co. of New Jersey's plant at Baltimore, Md., where he succeeds **John F. Ewing,** now assigned to special duties.

Henry G. McBurney, a member of Standard Oil Co. of New Jersey's technical service division staff at Bayway, N. J., has been transferred to Baltimore, Md., where he will have charge of crude distillation, catalytic and thermal cracking, alkylation, treating and attendant facilities at the company's refinery there.

Second Lt. Peveril O. Settle, son of **P. O. Settle,** attorney for the Fort Worth, Tex., division of Gulf Oil Corp., has been made aide-de-camp on the staff of **Maj. Gen. Harry H. Johnson,** former assistant to the vice president of Gulf, but now in command of the reactivated Second Cavalry Division at Fort Clark.

R. V. L. Stratton, manager of the land department of the Tulsa division of Tide Water Associated Oil Co., retired March 1, after spending 20 years with the company and its predecessors. A native of Salem, N. J., Mr. Stratton served a 4-year enlistment in the Navy and in 1907 he moved to Washington, D. C., where he served with a government agency and studied law. In 1911, he joined U.S.G.S., and in 1917 he resigned to accept a commission in the Naval Reserve Corps. He moved to Tulsa in 1920 and operated as an independent for 2 years before joining Tidal Oil Co. He spent 3 years as a troubleshooter, and when **Edwin W. McCrary,** then head of the land department, resigned, Mr. Stratton came to Tulsa as assistant to **E. H. Salrin,** vice president of land and leasing. When Mr. Salrin moved to Houston, Tex., Mr. Stratton became manager of the land department.

Claude N. Valerius, Barnsdall Oil Co. geologist at Texarkana, Ark., addressed the Shreveport, La., Geological Society March 1 on "The Geology of Midway Field, Lafayette County, Arkansas."

James A. Lewis, president of Core Laboratories, Inc., Dallas, Tex., addressed the student chapter of the A.I.M.E. at the University of Texas last week. He discussed application of core analysis and reservoir data determined from bottom-hole samples to successful completion practices.

Paul Rogers has been acting manager of the Beeville, Tex., district of Houston Natural Gas Co., Houston, Tex. **Tom Backus** recently became plant manager at West Columbia, Tex., and **Horace Owings** has been named acting manager at Silsbee, Tex., succeeding **Clifford H. NcKay,** who enlisted in the Navy. Mr. Rogers has been associated with company since 1935. Mr. Backus, prior to his present job, was with the company at Kingsville and Texas City, Tex. Mr. Owings for the past 6 years has been manager of Electrolux service for the company, residing in Houston.

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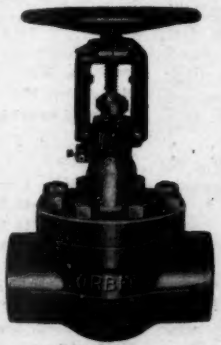

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Market Developments

East Coast

NEW YORK.—With the end of the heating-oil season less than a month away, hopes were increasing that it would be completed without experiencing another crisis like that of a month ago. These hopes were heightened by the spell of mild weather that persisted through the last week of February and the greater deliveries of fuel oil that are now coming into District 1. In spite of these favorable indexes, however, the overall supply situation remained extremely close and short.

That the effect of these developments has been minor is indicated by the A.P.I.'s index of available supply which declined from 36.5 to 35.2 after increasing in the preceding 2 weeks. In addition, PIWC supply committee representatives report that consumers stocks are very low, in many cases amounting to only 1 or 2 days' supply. Kerosene, particularly, remained very tight with a difficult distribution problem having developed due to the withdrawals of peddlers who normally supply small consumers.

The possibility of more trouble developing during March is indicated by the fact that it is normally the fourth coldest month of the season following January, February and December in that order. Statistics based on degree-days studies show that normally 14.91 per cent of cold weather is experienced in March compared to 17.68 per cent for December, 18.67 for January and 18.52 per cent for February.

First supplies from the Norris City, Ill., terminal of the WEP line were received in the East last week but the full benefit of the shortened haul will await the rerouting of trains to handle the volume of oil now available there.

Pacific Coast

LOS ANGELES, Calif.—Prices in the spot market remained unchanged during the past week. Fuel and gas-oil prices were firm and gasoline soft. In the retail market, there has been a definite trend toward the use of premium and first grade gasolines under the rationing programs. This reflects the desire for quicker starting to save battery wear. This swing to quality gasoline may induce independent marketers and refiners to get away from cut prices. This quality-conscious movement is especially marked in centers of consumption where demand is especially keen and prices vary accordingly.

A total of 165 service stations closed down in California during January and present indications point to the probability that suspensions in February will be somewhat lower.

On February 1, 1943, California had 3,645 idle service stations. Oregon had 514 stations suspended, Washington had 797 inactive, Arizona had 321 idle and Nevada had 119 closed.

Mid-Continent

TIGHTER conditions in the Mid-Continent refinery gasoline market were indicated this week. Demand and production appear to be in equilibrium. Some refiners are drawing on storage to accommodate current shipping instructions. Some of the larger refiners are purchasing or attempting to buy in the spot market because acquiescence to recent PAW regulations reducing the yield of motor fuel at District 2 plants has left the major manufacturers short on commitments.

Fuel-oil prices are steady at the higher gravity quotations and large consumers, particularly southwestern railroads, are clamoring for additional supplies despite the higher costs. Refiners are blending lighter oils with residuals up to the maximum economic limits in order to offset, as nearly as possible, the decreased revenue obtainable from lower yields on gasoline.

The interior market has absorbed without trouble so far the volume of motor-fuel products previously shipped by tank car from District 2 to destinations in District 1. Contributing to the relatively steady position of gasoline, however, has been the reduction in volume manufactured. Refiners switched their transportation facilities to fuel-oil service and this, in conjunction with lower yields of motor fuel, precipitated approximate balance between the two elements.

Declines in motor-fuel stocks during the third week in February may not be an accurate indication of a swing in the inventory trend. However, the current rate of major-company buying, if continued, will tend to liquidate stocks indefinitely at fixed rates of production.

A.P.I. REFINERY REPORT

Week Ended February 20, 1943

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	152	3,017	574	666
Ind., Ill., Ky.	743	19,505	2,755	3,881
Okla., Kan., Mo.	345	7,569	1,385	1,516
Censored area*	1,667	39,838	10,394	15,637
Rockies	87	2,000	536	369
California	700	20,286	54,784	11,298
Total 2-20-43	3,694	92,215	70,428	33,367
Total 2-13-43	3,605	92,313	70,666	34,292
Total 2-21-42	3,876	106,984	87,825	35,433

Note: Refinery runs and stocks for week ended February 27, 1943, appear on Trends page, unless unavoidably delayed.

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
February 20, 1943	234,562,000
February 13, 1943	234,239,000
February 21, 1942	255,861,000

*Excludes unrefinable in California.

Gulf Coast

HOUSTON, Tex.—Inability to move products to points where they are wanted continued to be the primary problem of many Gulf Coast refiners this week. Talk of a probable increase in the price of crude has deepened the reluctance of some refiners to make gasoline contracts involving long-term deliveries, even though their inventories are getting disconcertingly large. Adequate supplies of 91-octane gasoline for Army and Navy needs were said to be in hand, but offerings of 87-octane were shrinking this week. The latter grade is said to be largely at military training centers. Some Gulf Coast refineries were reported to be cleaned out of it because they had shifted to the higher grade to meet government demands.

Offerings of distillate gasoline from the Grapeland district, Houston County, Texas, were reported by Gulf Coast marketers this week, but so far as ascertained no sales were made. Scarcity of tank cars was said to have produced excessive stocks in the Grapeland area, and plants there were hunting for outlets. At least one refiner had abandoned efforts to move his product by tank car and was turning to trucks.

A little No. 2 heating oil, extremely hard to get for months, was said to be available at scattered refineries, if only tank cars were provided for its movement. Burning oils and heating oils generally were firm. Buyers were combing this area for kerosene without success and it continued to be the tightest product in the list.

Refinery Prices

(Prices as of March 2)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.250-6.500	6.125-6.250	5.750-6.000	5.125-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	3.875	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125	.....	.....	.....	.....	.....
California	.....	2.750-4.000	.....	.....	‡$1.35-1.45	$0.85-0.90
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85
Northeast Coast	.....	.....	.....	6.800	2.780	1.65
North Louisiana	.....	.....	.....	.....	.....	†0.80 0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.75‡	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	‡0.80-95	§0.80
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
650 flash	17.00	17.50

Neutral Oil
(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36 50
15 pour point		35 50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.100
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Com-bined tax	Kero tank wag.
Baltimore, Md.	15.95	5.50	10.20
Boston, Mass.	14.90	4.50	9.80
Burlington, Vt.	16.90	5.50	10.10
Buffalo, N. Y.	16.20	5.50	10.60
Dover, Del.	16.70	5.50	12.00
Hartford, Conn.	15.60	4.50	9.70
Manchester, N. H.	17.30	5.50	10.80
Newark, N. J.	15.20	4.50	9.70
New York, N. Y.	16.10	5.50	9.80
Philadelphia, Pa.	16.20	4.50	11.65
Pittsburgh, Pa.	16.70	5.80	12.00
Portland, Me.	16.30	5.50	9.90
Providence, R. I.	15.00	4.80	9.60
Washington, D. C.	15.20	4.50	11.00
Average 14 cities	16.02	5.14	10.49

(All prices undivided dealer basis.)

CENTRAL
(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co., and Texas Co.)

	Dealer tank wagon	Com-bined tax	Kero tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9 00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent-state tax.

SOUTHEASTERN
(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	19.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.00
Average 11 cities	18.34	7.50	10.46

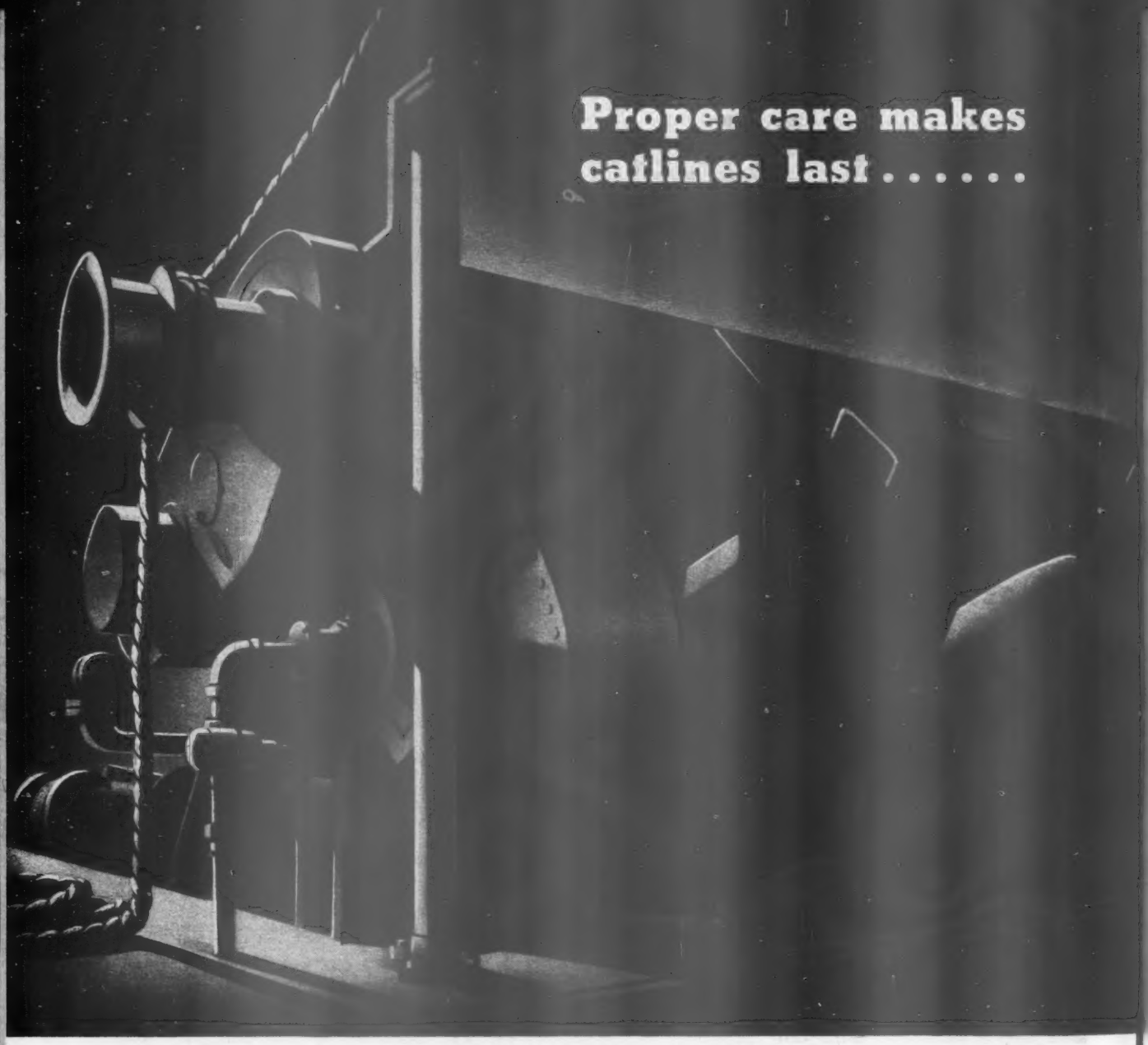
*Includes 1-cent state tax.
‡Includes ½-cent state tax.

MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	10.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Com-bined tax	Kero tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.55	5.96	10.76



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Circumstances that require no description make it important to get the best and longest service possible from catlines. And, to get the maximum work from any line — manila, sisal or plastic — it must be properly installed, handled and cared for.

Proper handling begins with removing rope from the coil. Contrary to general belief, the best way is to set the coil on its side and start pulling out the loose end on the inside rather than the outside. If the rope is started from the inside it will uncoil evenly and without kinking.

After the rope is placed in service it should not be overloaded or overheated. It should not be scuffed by running around sharp corners or projections. It should not be run over sheaves with offsize grooves, or used on worn catheads.

Care consists in keeping the rope clean and dry. Lines should either be kept clean of oil and dirt, or periodically washed and dried. A little fresh rain water or high pressure cold water will serve for washing.

Steam or scalding water should not be used for cleaning. Nor should the rope be dried on a steam line or boiler. When not in use, lines should be stored in a cool, dry place.

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MOLY

Equipment Progress

Establish Second South African Manufacturer

A second Meehanite manufacturer has now been established in Southern Rhodesia, South Africa, the F. G. Issels & Son, Ltd., of Bulawayo, according to Meehanite Metal Corp., Pittsburgh, Pa.

One of the oldest firms in the Colony of Southern Rhodesia, the company manufactures equipment for gold and other metal mines, and municipalities, and industries in South and Central Africa.

"E" Award to Elliott Co.

The Jeannette, Pa., plant of Elliott Co. has been awarded the coveted Army-Navy Production Award recognizing exceptional performance in supplying war material.

Before the pennant-raising ceremonies, Rear Admiral Watts, Colonel Eddy, a group of Navy and Army officers, and officials of the plant made an inspection tour of the plant

The Army-Navy "E" pennant was presented by Rear Admiral W. C. Watts, U.S.N., retired, to H. M. Hubbard, president of Elliott Co., who accepted it in behalf of the workers and management of the plant.

Lt. Col. Thomas H. Eddy, of the Pittsburgh Ordnance District, presented a token Army-Navy "E" pin to William Spicher, employe of Elliott Co. for 17 years, and World War 1 veteran, signifying that all employes of the company's Jeannette plant are now entitled to wear the "E" insignia.

The Elliott Co. was founded in 1900 by W. S. Elliott of Pittsburgh—originally organized to make a patented boiler-tube cleaner. The business grew rapidly and finally in 1914 it was moved to Jeannette. In 1916 the company acquired a plant at Springfield, Ohio, and in 1924 another at Wellsville. Two years later the company purchased the plant of Ridgway Dynamo & Engine Co., which is now operated as the Ridgway Works of Elliott Co.

Three New Circulating Steam Jets by Duriron

Three new circulating-steam jets have been announced by Duriron Co., Dayton, Ohio. In addition to being corrosion resisting, these jets are said to have the advantage of fitting snugly to the inside walls of either square or circular tanks, with a maximum projection of 4½ in.

The suspended and center-discharge types may be used in tanks of any depth. The floor type is adaptable for tanks of any depth up to 60 in. All types are so designed as to give complete agitation and circulation of the tank contents.

Made of the high-silicon iron alloy Duriron or the special stainless steel Durimet, they are highly efficient for heating acid solutions, dissolving powdered or lump chemicals, and for the digestion of ores and separation of sludge acids.

International Nickel Designs Corrosion-Data Work Sheet

A new corrosion-data work sheet has been designed by International Nickel Co. to assist executives and engineers in their study of corrosion problems. The work sheet acts as a check list to insure consideration and evaluation of all factors influencing a corrosive action. It also permits ready comparison of a problem with similar ones which may be used as a guide for selecting materials possessing a satisfactory resistance. This form was developed as a result of extensive experience with corrosion data inquiries that inadequately described conditions for which recommendations were sought.

Copies of the corrosion-data work sheet may be obtained without charge from Technical Service, International Nickel Co., 67 Wall Street, New York, N. Y.

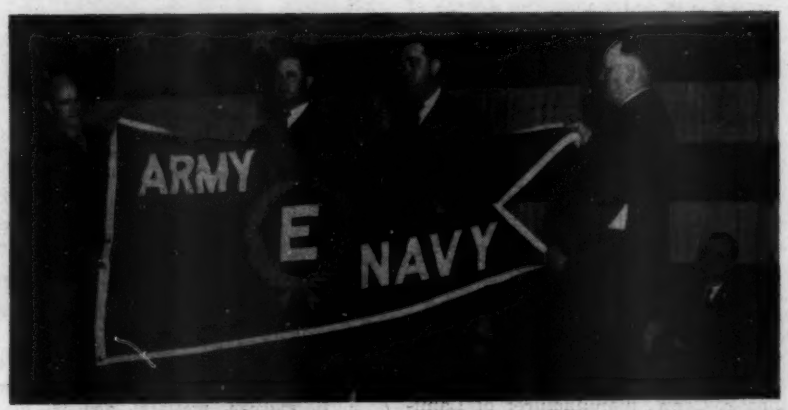
Trade Literature

Aluminum Co. of America, Pittsburgh, Pa.—A booklet on "Welding and Brazing Alcoa Aluminum," which is a completely rewritten edition of the company's welding booklet, and in addition to welding, it incorporates the art of brazing. The booklet has 100 pages, with several closeup illustrations.

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—A folder on practical help on wartime selection of electric motors.

ARMY-NAVY AWARD GOES TO BREWSTER CO.

The Brewster Co., Shreveport, La., is another recipient of the Army-Navy "E" award. Official presentation was made February 4, the ceremonies being held in the municipal auditorium. Principal address, and presentation of the award were made by Col. E. C. Bomar, district chief, Birmingham Ordnance district. A. Olin Price, vice president and general manager of the company, accepted the pennant, and Herbert A. Harlan, production manager, and Earnest D. Garrett, chief engineer, accepted the "E" pins on behalf of the employes.



Col. E. C. Bomar, district chief, Birmingham Ordnance district; Lt. Comdr. Kenneth C. Elliott, United States Navy; H. A. Harlan, production manager of Brewster, and A. Olin Price, vice president and general manager of Brewster

Crane Co. Awarded Army-Navy "E"

Reported to be the largest indoor "E" award ceremony on record, 15,000 workers and guests took part in the recent presentation at the Chicago works of Crane Co., world's largest manufacturer of valves and fittings. The honor was given Crane in recognition of the volumes of valves produced for the Navy, Army and for vital war industries. The impressive ceremony was held between shifts and was broadcast over a nation-wide radio network while all personnel in all Crane's 138 branches throughout the United States listened in. The program was opened by V. P. Rumley, vice president in charge of manufacturing, with Capt. L. P. Lovette, U.S.N., as master of ceremonies. Rear Adm. Clark H. Woodward, U.S.N., retired, chief of incentive division, Navy Department, and designer of the present "E" award, presented the flag to John H. Collier, president of Crane Co. "E" pins were given to six representative workers by Col. J. F. Butler, U.S.A., chief of military personnel branch of Sixth Service Command. Acceptance on behalf of his fellow workers was made by Howard H. Upton, a special turret lathe operator in the steel-valve department. Among the guests were a number of the 3,600 Crane workers now in the armed forces.

Estelle Maslowski, representative worker; Rear Adm. Clark H. Woodward; J. H. Collier, president of Crane Co.; Howard H. Upton, representative worker, and Col. J. F. Butler

Foote Bros. Appoint Assistant Sales Manager

Foote Bros. Gear & Machine Corp., manufacturers of gears and speed reducers, 5225 South Western Boulevard, Chicago, Ill., announce the appointment of B. H. Quackenbush, as assistant sales manager. Mr. Quackenbush is a graduate of the mechanical engineering college of University of Illinois and after studying law, was admitted to the bar in 1936. In 1933, after a number of years' experience in engineering work, he joined Foote Bros., and in 1936 he was placed in charge of the contract division.

In his new capacity, Mr. Quackenbush will continue to handle contract sales and, in addition, will supervise the activities of the priority department and sales department under the Office of Price Administration on price regulations.

Among Equipment Men

Wickwire Spencer Appoints Shattuck Sales Manager

Wickwire Spencer Steel Co., 500 Fifth Avenue, New York City, has announced the appointment of Wilfred C. Shattuck as wire sales manager. He will be located in the company's New York offices. Mr. Shattuck was graduated in 1924 from Brown University with the degree of Ph.B. After a year's law study at Columbia University, he joined the sales staff of Wickwire Spencer, with whom he remained in various sales capacities until 1940.

He returned to Wickwire after 2 years with John A. Roebling's Sons Co., first in their New York offices and later as manager of sales, round wire, flat wire and specialties division, Trenton, N. J.

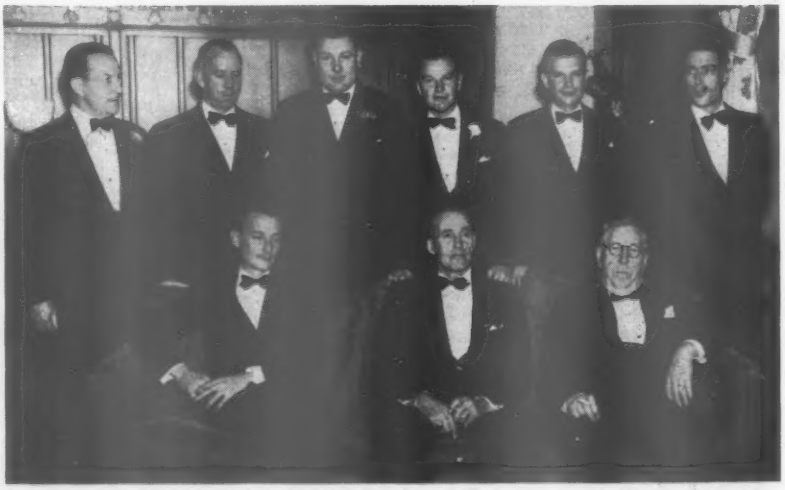
Laminated Shim Co., Inc. Vice President Retires

Laminated Shim Co., Inc., Glenbrook, Conn., manufacturer of Laminum shims and shim stock and Ancor-lox self-locking nuts, announces the retirement of Earl L. Young, vice president in charge of production. Mr. Young has been with the company 22 years, since February 1, 1920, and has been in charge of production to the date of his retirement.

Mathieu Addresses Society

J. L. Mathieu, vice president of Schlumberger Well Surveying Corp., addressed the Fort Worth Geological Society, February 15. Mr. Mathieu's address was on the Schlumberger S.P. Dipmeter, a new instrument which measures the orientation and value of formation dip insitu.

LOS ANGELES NOMADS HOLD FOURTH INAUGUARL BALL



The fourth annual inaugural ball of the Los Angeles chapter of Nomads was held February 19. More than 200 Nomads and guests attended. Shown here are the new officers, in whose honor the affair was given. Seated: W. F. Bettis, regent; H. R. Pullman, president, and W. R. Martin, regent. Standing: W. A. Sawdon, secretary; T. Martin, assistant secretary; J. V. Robinson, sergeant at arms; R. E. Smith, vice president; E. R. Smith, treasurer, and R. Henquet, assistant treasurer. L. G. Trembley, deputy sergeant at arms, not shown in the picture

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE

8 CENTS A WORD, minimum charge $2 per insertion.

SITUATIONS WANTED. 4 cents a word, minimum charge $1.

BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.

10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.

All classified advertising payable in advance.

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Classified display advertising set in single or double column style:

1 inch	1 time	$7.00
1 inch	13 times	6.50
1 inch	26 times	6.00
1 inch	39 times	5.50
1 inch	52 times	5.00

Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

LEASES AND DRILLING BLOCKS

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma,

Louisiana and Illinois.

20 Years' Experience

Inquiries Invited

B. D. BUCKLEY

60 Broadview Drive, Clayton

St. Louis, Mo.

NEW MEXICO

State Oil and Gas Leases

Forty acres and multiples thereof, in a new HoT spot. 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington. N. M.

WANTED TO PURCHASE developed producing oil properties in Kansas or West Texas. Prompt action. C. C. Harmon, Nowata, Okla.

U. S. OIL LANDS, opened by Congress to filing for Government oil lease, 12½% royalty. Want several join filing structure. Small expense. Box B-491, The Oil and Gas Journal, Tulsa, Okla.

160-ACRE LEASE available, Sec. 29 and 30, Township 10 North, Range 12 East, Okfuskee County, Oklahoma. Gas within one-quarter mile. Joseph Low, 150 W. 79th St., New York City.

OIL MEN—Why don't you try semi-proven Junet Structure in Grant County, Ark.? We give you 2500 to 3000 acre block. Vinc. Herodes, 1534 So. Pulaski Rd., Chicago, Ill.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS

Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

THE BURKHART LINE of Legal Blanks Since 1908. Oil-Gas and Business Forms for Mid-Cont. and Illinois Basin. Leases Rev. with Gov.'s Regulations. Catalog and Samples. Burkhart Ptg. & Sta. Co., 115 So. Cincinnati, Tulsa, Okla.

PATENT ATTORNEYS

PATENTS, Trade-Marks. Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

INCORPORATION

DELAWARE CHARTERS: Powers broad, taxes low. Many of the largest corporations have Delaware charters. Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

ROYALTIES

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

HELP WANTED

WANTED: Chief Chemist or Chemical Engineer for 8,000 bbl. refinery in Central Oklahoma. Permanent position. In reply state education, age experience, draft status, and salary expected. Box B-506, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS ENGINEERS

Graduate Chemical Engineers and Chemists. Prefer men with experience in refinery or gasoline plant on design or operation of light end equipment. Location, Mid-West. Permanent position. In reply state experience, education, age, draft status and salary expected. Box B-510, The Oil and Gas Journal, Tulsa, Okla.

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

HELP WANTED

WANTED

Instrument man preferably with oil refinery experience for development laboratory of large eastern manufacturer. Work includes development new devices for pilot plant. Good opportunity for right man. Box B-482, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Draftsman for general refining drafting. Permanent position. Reply must state experience, education, age, draft status, expected salary, and references. Box B-511, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Man with geological and land experience especially in Illinois, Indiana, and Kentucky. Give experience, present connection, and salary desired. Box B-512, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Chemists and Chemical Engineers by Research & Development Division of well established, progressive Oil Company located by middle west. Men or women considered. Furnish full details of academic training, experience, draft status, salary expected, age, and recent photo with application. Box B-515, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

GRADUATE PETROLEUM ENGINEER with responsible experience in all phases drilling, production, secondary recovery, pressure maintenance, geology, evaluations, leasing and royalties. Foreign location acceptable. 3B draft classification. Box B-473, The Oil and Gas Journal, Tulsa, Okla.

LAND AND TITLEMAN: Many years experience Oklahoma, Kansas, Illinois. Several years service in legal and land department of major company and as assistant manager of land and production department of active independent producer-refiner. Experienced in scouting, lease, royalty and right-of-way buying and adjustment of damage claims. Expert titleman, typist. Age 40. Married. Excellent health. Draft IV-H. Can furnish new car. Presently employed. References. Box B-498, The Oil and Gas Journal, Tulsa, Okla.

OIL ACCOUNTANT now employed wishes change for betterment. 20 years experience in accounting, office management and personnel directing. Age 46. Married. No children. Most any location considered. Box B-492 The Oil and Gas Journal, Tulsa, Okla.

OIL ACCOUNTANT, office manager, 20 years experience, age 44, draft deferred. Box B-500, The Oil and Gas Journal, Tulsa, Okla.

CHEMIST with 13 years technical, manufacturing, and supervisory experience in production and refining. Only positions of responsibility considered. Box B-502, The Oil and Gas Journal, Tulsa, Okla.

EXECUTIVE ENGINEER, age 38, 20 years active experience sound organizations, refining and heavy chemical field. Well versed equipment, processes, engineering, estimating and construction. Desires contact management where this experience can be used. Box B-513, The Oil and Gas Journal, Tulsa, Okla.

REFINERY Manager-Superintendent with 10 years experience all phases refining plus 10 years experience in all phases of management. Would be interested in managing small refinery on profit-sharing basis. Box B-514, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST - GEOPHYSICIST — Experienced in surface and subsurface geology; seismic and gravity interpretation; scouting and some land work. Major part of experience in Mid-Continent and Texas-Louisiana Gulf Coast. Now employed in Mid-Continent area. Age 40, Married, one child. Box B-517, The Oil and Gas Journal. Tulsa. Oklahoma.

OIL ACCOUNTANT, soon available, desires permanent connection with independent operator. Actually experienced in accounting, office management, taxation, government regulations, etc., for production and drilling operations, corporation and individual. Box B-516, The Oil and Gas Journal, Tulsa, Okla.

(Continued on Next Page)

CLASSIFIED ADVERTISING — EQUIPMENT FOR SALE

3 COMPLETE CRACKING UNITS

5,000 barrel topping, 2,200 barrel cracking, 1,000 barrel gasoline recovery plant, car load Ethyl plant, approximately 50 storage tanks from 200 to 55,000 barrels included—
Located—KILGORE, TEXAS

2,000 barrel Vis-Breaker, 500 barrel asphalt plant—
STARK, MICHIGAN

1,200 barrel cracking unit—Complete, located—ST. PAUL, MINN.

All towers, pumps, valves, fittings, instruments, boilers, and other miscellaneous equipment to be sold separately.

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry — Robt. W. Duden
Union Ave. at 21st Street — Tulsa, Oklahoma

USED Cranes, Shovels, Draglines, Clamshells, Graders, Pumps, Compressors, Generators, Gasoline and Electric Motors, and other Contractors' Equipment. L. A. ROUNTREE, 362 Pierce Street, Gary, Indiana.

FOR SALE—One partial list steam rotary equipment located near Coyle, Oklahoma, priced right to sell. Inquire T. T. Eason and Company, Enid, Okla.

DIESEL ENGINES
Large selection—all sizes and types. Generator units, marine engines, gasoline engines, auxiliaries — also boilers, steam engines, turbo generators.
Complete information on request.
A. G. SCHOONMAKER COMPANY
80 Church St. New York, N. Y.
Phone—Worth 2-0455-6-7

COMPRESSORS—TANKS—FOR SALE
2—Bessemer type 8, direct driven engine and compressors, 80 hp., 180 r.p.m. Engine cylinder 16 x 20 and air cylinder 7 x 20. 2—Bessemer compressors same as above with air cylinder 14 x 20. 3—8,000 gallon capacity steel gasoline storage tanks, size 10'x13'x¼", riveted. Louisiana Iron & Supply Co., Longview, Texas.

FOR SALE: 30,000 barrel oil storage tank, condition perfect. F. H. Gregory, Pharr, Tex.

4—Lucey boilers & headers, Ideco drawworks, Ideal & Oil Well twin cylinder drilling engines, 18" Wilson-Snyder, & 14" Ideal pumps, 6" Gray Swivel, Boykin rotary, drill cables, boiler feed pumps, Ideco crown block, engine substructure, engine skids, 122' steel derrick & substructure, traveling block & hooks, Moon generator, 9000' 4½" & 3½" drill pipe, 1000' of 4" Victaulic pipe, blowout preventers, Brewster core reel & lime, Xmas tree, 1000 bbls. Parkersburg tanks, and other equipment. First class condition. Prices right. For particulars communicate Sorrento Petroleum Corp., American Bank Bldg., New Orleans, La.

Second hand Oklahoma City alloyed sucker rods, ¾", ⅞" and 1".
Sucker Rods, Fishing Tools, Tubing Spiders, Tubing Catchers, all sizes.
Structural Steel and Reinforcing Rods.
M. R. TRAVIS
1702 S. Boulder Tulsa, Oklahoma.

DIESEL—GAS—ENGINES
Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.
Complete information on request.
A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

FOR SALE: At Oklahoma City 4 Parkersburg #4901-C, 424,000# capacity, 123' Rotary Derricks. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: Complete steam rotary drilling rig with 126 foot steel derrick and equipment located in Wyoming-Montana Field. Box B-505, The Oil and Gas Journal, Tulsa, Okla.

6—RECONDITIONED automatic stop and check valves, three inch, Series thirty, flanged. Industrial Supply & Equipment Co., Inc., 338 Baronne St., New Orleans, La.

FOR SALE: Two 250 hp. boilers, two stage air compressor 75 kw. ac. generator, ammonia condensers, receivers, pumps, hoists, motors, absorbers, generators, valves and fittings. Must dismantle immediately. Complete Dead Weight Gauge Tester, Watt Hour Meter, 125 Volt, 150 Amp. Capital Ice Refrigerating Co., Indianapolis, Indiana.

FOR SALE: At Hobbs, New Mexico—2—65 HP, 1—85 HP. LFB Boilers. Cities Service Oil, Patridge, Bartlesville, Okla.

1000—6" Style 38 Reconditioned Dresser Couplings with new Armored Gaskets. Utility and Industrial Supply Co., Jackson, Michigan.

2—120 HP, 650 RPM, rebuilt Diesel engines, power units.
1—200 HP, 514 RPM, completely rebuilt Diesel engine, power unit.
The two above can be supplied with Generators if desired.
2—66 HP Boilers.
1—75 HP variable speed A.C. Motor.
4—45 HP 950 RPM, new Atlas Imperial gas engines.
Also variable sizes small alternating current motors.
K. S. RICHARDS
P.O. Box 443 Fort Worth, Texas
Phone 3-5600

1—2 Reel Unit and Two-in-one Indicator and Measure Meter (Frank Mathey Machine Works Unit) Magazine and Body. Extra Magazine. 50—Copper Cans. 50—White Glycerin Can Covers. Approximately twenty shots have been run on this outfit. Ansberry Torpedo Co., Senecaville, Ohio.

Used Engines, and Compressors,
We Rebuild and Guarantee
L. F. SMITH CO.
217 W. Archer, Tulsa, Okla.

5—7½"x20" Type VS, 500-lb. W. P. Clark Compressor Cylinders complete with clearance pockets. Call or write Cimarron Gasoline Corp., Box 346, Coyle, Okla.

FOR SALE—Bolted Tanks 5000 and 10,000 barrel capacity API construction, practically new. Feldman Petroleum Company, 544 W. Roosevelt Rd., Chicago.

2— 565 HP at 1200 RPM 8 Cyl. Sterling Comb. Gas Engines, Direct connected to 300 KW 480 Volt 60 Cycle General 3 Phase Electric Generators Alternating Current Complete.
2—165 HP at 1800 RPM 6 Cyl. Sterling Comb. Gas Engines Direct connected to 100 KW 400 Volt 3 Phase 60 Cycle A.C. General Electric Generators Complete.
4—200 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.
3—150 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.
1—75 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.
MAJOR TOOL & SUPPLY CO.
Oklahoma City, Okla.

WAUKESHA - HESSELMAN OIL ENGINES, REBUILT. 4 Cylinder 25 hp. with natural gas conversion. 6 Cylinder 130 hp. equipped with special governor. DIESEL ELECTRIC ENGINEERING CO., 14 N. Clinton St., Chicago, Ill.

FOR SALE—Bessemer Gas Engines, Compressors and repair parts. Vessels, towers, pumps, Chaplin Fulton regulators, Fisher liquid level controls, vacuum, pressure & temperature recorders, meters, valves, fittings, pipe and other miscellaneous material. GILBERT PIPE & SUPPLY, Electra, Texas.

STANDARD CABLE OUTFIT, all steel, complete tools, bits 20" to 6" with stems, jars, sockets, bailers, etc., lighting plant, boilers, engines. Sell complete or separate items. S. W. Pressey, Pueblo, Colorado.

FOR SALE: Russell, Kansas, 1-122' American Steel Angle Iron Derrick knock-down, capacity 246,000#. Cities Service Oil Company, Patridge, Bartlesville, Okla.

1—11' Stroke Type J 31 Parkersburg Pumping Unit less Engine. 1—Type R Double Drum Cardwell Unit with Rotary and Spudder attachment with HXD Hercules Diesel Engine. 3—27½" Emsco and Union Tool Oil Bath Tables. 1—7¼ x 12 Cardner Denver Power Pump with Skids. Major Tool & Supply Co., Oklahoma City, Okla.

FOR SALE: TWO USED 2-CYCLE TWIN HORIZONTAL SEMI-DIESEL single flywheel engines mounted on steel skids complete with all regular equipment and lubricator, drive shaft supported by SKF bearings, with V-belt drive and auxiliary sheaves. GOOD CONDITION.
1—size 12½ x 16" Reid
1—size 13¼ x 16" Reid
THE NATIONAL SUPPLY CO.
Fort Worth, Texas

FIRE TUBE BOILERS
(New or Used)
ONE WEEK'S DELIVERY AFTER RECEIPT OF ORDER
MOORE & COMPANY
1701 Nat'l Bank of Tulsa Bldg.
Tulsa, Oklahoma
Telephone 2-0058

1—4" Shell 4' x 40' Forged Steel Reaction Chamber
1—½" Shell 5' x 74'—4000 barrel cap.—Crude Oil Fractionator with Trays.
120—Pieces 3" I. D.—3½" O. D.—30' long—Chrome Tubes.
30—Pieces 3½" I. D.—4" O. D.—21' to 28' long—Chrome Tubes.
162—3½" O. D.—6½" Centers—Chrome Key Headers.
30—Pumps, various sizes and types.
A. C. BARTSCH
BOX 127, FOREST PARK, ILLINOIS

Classified Advertising

EQUIPMENT FOR SALE

1—Used 7x8 Worthington Vertical Triplex power pump, cheap. INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 338 Baronne St., New Orleans, La.

USED ADMIRALTY Metal Condenser Tubes as good as new. One steel Building 64 feet by 206 feet. One Steel Building 50 feet by 280 feet. Industrial Supply and Equipment Co., Inc. 338 Baronne Street, New Orleans, La.

FOR SALE

2—95 H.P. Mercury skid type power units with transmissions. 2—Portable air cooled engine driven 1500 watt electric light plants. 1—100 H.P. Miller direct-driven, 2 stage compressor. 1—80 H.P. Bessemer single stage compressor. 1—15 H.P. Bessemer gas engine. 4—25 H.P. Bessemer engines, push & pull powers & power houses. 1—5½ Keystone drilling rig complete with tools. 6000 ft. of 4⅞" casing. 9000 ft. of 6¼", 13# casing. 4000 ft. of 4½" A-1 rotary drill pipe. 3500 ft. of 3½" first grade rotary drill pipe.

Veeder Supply & Development Co.
Cherryvale, Kansas

FOR SALE—One complete steam rotary outfit less boilers, located near Coyle, Oklahoma, priced to sell. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE—Approx. 6500 ft. 6⅝" OD 25.20# drill pipe with Reed Full Hole Shrink Grip Tool Joints, A-1 condition. Inquire T. T. Eason and Company, Enid, Okla.

BUCKEYE Model 15 ditching machine. T. & L. Construction Co., P. O. Box 79, Phone 2653, Centralia, Ill.

1-#2 NATIONAL DRILLING Machine, wooden mast. Call or write E. M. Howard, Rising Star, Texas.

FOR SALE: Lufkin pumping unit suitable for 4000' well. Melton Supply Co., Seminole, Okla.

FOR IMMEDIATE SHIPMENT FROM STOCK

125—20" Dresser Couplings complete with with Rubber Rings and Bolts, perfect condition.

50—30" Dresser Couplings complete with Rubber Rings and Bolts, perfect condition.

BROWN-STRAUSS CORPORATION

Box 78
Kansas City, Missouri

EQUIPMENT WANTED

WANTED: Well servicing units in good condition. All makes and sizes considered. We pay cash. Melton Supply Co., Seminole, Okla.

DIESEL ENGINES WANTED
1500 HP in one or more units with or without Generators. Single unit preferred. Give full information. Box B-418, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Truck load quantities, or more, of used small pipe, black and galvanized, ½", ¾", 1", 1¼" and 1½", shopped or unshopped. Advise price and location. CENTRAL PIPE & SUPPLY CO., 2611 Avenue H. Lubbock, Texas.

WANTED

Abandoned Pipe Lines, in or out of the ground, **Oil Wells, Steel Buildings** and **Steel Storage Tanks** of all sizes.

JOS. GREENSPON'S SON PIPE CORP.

National Stock Yards, St. Clair Co., Illinois.

RANCHES AND FARM LANDS

2000 ACRES IMPROVED livestock farm. Choctaw County, Oklahoma. On Federal Highway. Abundant water, pasture, meadow, timber, and arable land. Excellent building sites. J. J. Thomas, Seward, Nebraska.

GEOLOGISTS

WANTED GEOLOGIST: Reliable party will furnish money to buy acreage and give interest in exchange for professional services. Box B-490, The Oil and Gas Journal, Tulsa, Okla.

REAL ESTATE

WINNFIELD, LA.

Center of North Central Louisiana oil activity, invites oil men and oil concerns to make their homes and headquarters at Winnfield.

TOWN OF WINNFIELD
City Hall — Winnfield, La.

MONEY RAISING

Prime LOANS to CORPORATIONS and INDIVIDUALS

Unsecured or Collateralized

LARGE Sums—LOW annual rates.

COLLATERAL DISCOUNT CORP.
Graybar Bldg.—New York City

Wyoming Black Oils Raised 15 Cents a Barrel

WASHINGTON, D. C.—Maximum prices for crude were increased 15 cents a barrel February 26 in 20 Wyoming black-oil fields by the Office of Price Administration.

The action was taken in order to maintain supply and provide a fair and equitable return of those producers who develop new production in accordance with the recommendations of the PAW.

Maximum prices for Wyoming black oils were previously frozen at around 50 cents a barrel on the basis of October 1, 1941, prices.

The new maximum prices at the receiving tank for black oils produced in the fields designated are as follows:

Field—	Price per bbl.
Black Mountain	$0.55
Byron	.70
Circle Ridge	.65
Dallas and Derby	.55
Frannie, light	.85
Frannie, heavy	.62
Garland	.60
Grass Creek, heavy	.65
Hamilton Dome	.60
Hudson (Lander)	.725
Maverick Springs	.6625
Notches	.75
Oregon Basin	.65
Pilot Butte	.80
South Casper Creek	.65
Poison Spider	.65
Spindletop	.65
Shoshone	.65
Salt Creek, Tensleep	.8285
Sheep Creek	.65

The higher maximum prices for the various fields, OPA said, will tend to maintain production which averaged about 35,000 bbl. per day in 1942 and provide a fair return to those who may develop new production.

Crude-Oil Prices

(Continued from Page 89)

Gulf Refining Co.:
Illinois basin, 5-21-41 ..... $1.37

Michigan

Simrall Corp., 5-27-41:
Greendale, Porter, Vernon, Crystal, and Wise $1.44
Buckeye, Bentley, Edenville, Beaverton, and Monitor (sweet) 1.42
Freeman, Redding, Lincoln and Winterfield 1.39
Hamilton-Grout 1.29
West Branch-Arenac 1.34
Sohio Corp., 5-1-41:
Bloomingdale-Columbia $1.45
Mid-West Refineries, Inc., 5-1-41:
Kent County $1.38
Pure Oil Co., 5-27-41:
Sherman $1.39
Midland (Midland County) 1.44

ROCKY MOUNTAIN GRAVITY TABLE

Below 29 ..... $0.96
29-29.9 ..... .96
30-30.9 ..... 1.00
31-31.9 ..... 1.02
32-32.9 ..... 1.04
33-33.9 ..... 1.06
34-34.9 ..... 1.08
35-35.9 ..... 1.10
36-36.9 ..... 1.12
37-37.9 ..... 1.14
38-38.9 ..... 1.16
39-39.9 ..... 1.18
40 and above 1.20

Stanolind Oil & Gas Co., 5-20-41, includes Dutton Creek, Midway, and Salt Creek except Tensleep crude, Wyoming.

Sinclair-Wyoming Oil Co., 5-20-41, includes Salt Creek and Lost Soldier, except Tensleep crude, Wyoming.

Continental Oil Co., 5-21-41, includes Fort Collins and Wellington, Colorado.

Wyoming

Ohio Oil Co.:
Rock River (5-20-41) $1.10
Lance Creek (7-1-41) 1.12
Elk Basin and Grass Creek (light) 1.00
Stanolind Oil & Gas Co.:
Frannie (light) 2-26-43 ..... $0.85
Frannie (heavy) (2-26-43) ..... .62
Grass Creek (light) (5-20-41) 1.00
Grass Creek (heavy) (2-26-43) ..... .65
Hamilton dome (2-26-43) ..... .60
Elk basin (5-20-41) 1.00
Salt Creek (Tensleep) (2-26-43) ..... .8285
Continental Oil Co.:
Big Muddy (5-30-41) $1.08
Lance Creek (9-1-41) 1.12

Montana

Continental Oil Co., 4-1-41:
Cat Creek $1.15

Colorado

Stanolind Oil & Gas Co., 5-20-41:
Iles $1.07
Continental Oil Co., 5-21-41:
Canon City-Florence $1.05

LEGAL

OIL AND GAS LEASE

UNITED STATES DEPARTMENT OF AGRICULTURE, Farm Security Administration, Little Rock, Arkansas, February 23, 1943. Sealed bids in triplicate will be received until 2 p.m., CWT, April 1, 1943, and then publicly opened, offering bonus for operating rights in connection with gas and oil leases on 1730 acres of land located in T. 16 N., R. 14 E., T. 16 N., R. 13 E., T. 15 N., R. 13 E., and T. 15 N., R. 14 E., Madison Parish, Louisiana, near Thomastown. Award of lease will be made only to bidder who can show sufficient experience and financial resources and prove citizenship. Interested parties may obtain bid documents, lease forms, and operating regulations from the office of the Regional Business Manager, Farm Security Administration, 310 Donaghey Trust Building, Little Rock, Arkansas.

Journalisms:

REFINERS are finding it necessary to make use of different fuels under war conditions. Robert Reed, engineer of John Zink Co., Tulsa, has studied the efficiency of burners using different fuels and the results of his research in the complex subject of combustion will be presented in the Engineering and Operating Section of The Journal next week.

A THICK salt section coupled with anhydrite and cherty limestones afford plenty of headaches for operators in West Texas. The next area scheduled for major development in that area is in southern Andrews County where the San Andres, Tubb and Ellenburger pays are being exploited at the present time. In his recent visit to the area, Harry F. Simons has gathered data on the ways in which operators are successfully meeting their problems and has an article on the subject in next week's issue.

IMPROVEMENTS in methods of operating large gas-compressor stations which have been tested at one of the nation's most efficient plants are covered in a staff article in next week's Journal. These include methods of reducing time and effort in starting large compressor units, facilities for making the lubricating system more effective and equipment for saving time in routine operations.

GEOLOGICAL descriptions of producing areas showing structure and describing reservoir conditions are of importance in providing operators in similar areas with a basis for planning development. One phase of geology which is not widely discussed is the conditions governing the formation of oil and its accumulation in sediments. A discussion of this phase is applicable to any area because sediments in one basin and of one age are very like those in other basins deposited at different times and the conditions governing oil accumulation are thus repeated. In an early issue of The Journal, Maj. B. F. Hake, formerly with Gulf Oil Corp. will discuss the geological background of oil production in Illinois in an article which will have much more than local interest.

CALENDAR

March

NORTH TEXAS OIL AND GAS ASSOCIATION, annual meeting. Wichita Falls, Tex., March 6.

PETROLEUM INDUSTRY COMMITTEE, marketing committee for District 2, 624 S. Michigan Avenue, Chicago, Ill., March 9.

AMERICAN GAS ASSOCIATION, war conference on industrial and commercial operations, Detroit, Mich., March 11-12.

OKLAHOMA UTILITIES ASSOCIATION, conference for executvies and department heads, Tulsa Hotel, Tulsa, March 22.

AMERICAN PETROLEUM INSTITUTE, spring meeting, Division of Production, Pacific Coast District, Biltmore Bowl, Los Angeles, Calif., March 23.

April

INTERSTATE OIL COMPACT COMMISSION, quarterly meeting. Wichita, Kans., April 2-3.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS. annual meeting, Texas Hotel, Fort Worth. Tex., April 7-9.

AMERICAN PETROLEUM INSTITUTE, Division of Production, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 8-9, 1943.

AMERICAN CHEMICAL SOCIETY 105th annual meeting, Detroit, Mich., April 12-16.

NATURAL GASOLINE ASSOCIATION OF AMERICA, twenty-second annual meeting, Baker Hotel, Dallas, Tex., April 14-16.

NATURAL GAS MANAGEMENT CONFERENCE, under auspices of Natural Gas Section, American Gas Association, Gibson Hotel, Cincinnati, Ohio, April 28.

AMERICAN PETROLEUM INSTITUTE, DIVISION OF PRODUCTION, Southwestern District, spring meeting, Rice Hotel, Houston, Tex., April 29-30.

May

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, annual meeting, Houston, Tex., May 5-6, 1943.

NATIONAL FIRE PROTECTIVE ASSOCIATION, Palmer House, Chicago, Ill., May 10-15.

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